DRAFT
UPPER CLARK FORK RIVER BASIN WATER MANAGEMENT PLAN

Prepared by
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STEERING COMMITTEE

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I. RECOMMENDATION SUMMARY

The following are summaries of recommendations found in Sections V and VI below. The page number of the full recommendation are noted in each instance.

A. BASIN CLOSURE (Page 38)

The legislature should close the Upper Clark Fork River Basin to the issuance of most new surface and ground water use permits. The area closed should include the entire Clark Fork and Blackfoot River drainages above Milltown Dam. The closure is not intended to affect water uses that do not require a water permit. It should be conditioned so that it would not preempt new permits for the development of:

1) Storage for beneficial uses;
2) Stock water;
3) Uses determined to be non-consumptive; and
4) Superfund remedies, except for dilution, required by the U.S. Environmental Protection Agency for Superfund sites designated as of January 1, 1994.

The exemption for Superfund remedies should expire after five years on January 1, 2000, so that applications for new water rights permits for this purpose would have to have been filed on or before December 31, 1999.

A "non-consumptive use" means a beneficial use of water that does not cause a reduction in the source of supply because substantially all of the water returns without delay to the source of supply, causing little or no disruption in stream conditions.

Concerning ground water use, existing law does not require a permit for a well producing water at less than 35 gallons per minute not to exceed a total volume of 10 acre-feet per year. This proposal would not change this situation so that wells under this production limit could continue to be drilled for any purpose.

It should also be noted that including ground water in the closure as proposed would not allow city and towns to obtain a permit for new wells for drinking water or other municipal uses. Municipalities will still be able to purchase or condemn existing water rights to expand domestic water supplies.

The closure and the exemptions will be reviewed by the ongoing basin-wide committee after five years, and necessary changes will be recommended to the legislature. The closure can be modified, extended, or ended by action of the legislature after the review.

B. ONGOING WATER AND PLANNING AND MANAGEMENT MECHANISM (Page 41)

The legislature should provide for an ongoing basin water planning and management mechanism including a basin-wide committee and watershed committees. The mechanism should not be vested with legal authority to compel any action by any water user or water interest. Its purposes should, instead, include:

1) Providing a forum for all interests to communicate about water issues;
2) Providing education about water law and water management issues;
3) Identifying short-term and long-term water management issues and problems and alternatives for resolving them;
4) Facilitating resolution of water related disputes via consensus-based collaborative processes including mediation;

5) Providing coordination with other basin management and planning efforts, such as county drought committees and the Tri–State Section 525 Water Quality Implementation Council;
6) Advising the government agencies about water management and permitting activities;
7) Consulting with the basin's local governments; and
8) Reporting periodically to some entity with water management authority such as the legislature.

For the first two years the members of the basin–wide committee will be appointed by the Director of the Department of Natural Resources and Conservation. Members will include representatives of the following local basin water interests: agriculture organizations; conservation districts; environmental organizations; industries; local, state, and federal governments; reservation applicants; utilities; and water user organizations. The ongoing basin– wide committee will recommend modifications of the selection process to the 1997 Legislature if another method is identified that better ensures local input to member selection while maintaining the broad range of member representation of basin water users. The basin–wide committee will continue to decide the membership of watershed committees.

C. PROTECTION OF EXISTING WATER RIGHTS (Page 42)

Any action taken by the legislature or any executive branch agency in response to this plan must be predicated on preserving existing water rights.

D. WATER ADJUDICATION SYSTEM (Page 42)

The Montana Reserved Water Rights Compact Commission should make the U.S. Forest Service a high priority among the federal agencies in actively negotiating a reserved water rights compact. Further, if the commission takes a geographical approach to the Forest Service's reserved water rights claims, the Rock Creek drainage should be studied as a test case of a basin where Forest Service claims are downstream of state–based private water rights claims.

E. WATER STORAGE (Page 43)

1. Structural Storage

The ongoing basin water planning and management mechanism will continue the investigations of the priority new and expanded existing water storage sites identified in the Upper Clark Fork River Basin Steering Committee study of possible increases of water storage in the basin. In particular, it will identify the potential beneficiaries of and a funding mechanism for these priority sites.

The Steering Committee was unable to consider and make recommendations concerning the existing Georgetown–Storm–Silver Lake system because ownership of the facilities and water rights associated with it were clouded by litigation. When this litigation is resolved, this system should be studied to determine if it contains unused storage capacity that might benefit basin water users.

The ongoing basin water planning and management mechanism should also create some means to examine additional storage options in the basin as they arise.

2. Non–Structural Storage

The ongoing basin water planning and management mechanism will continue to support the Flint Creek return flow study so that water users in the watershed can better understand and manage return flows to benefit in–stream and diversionary water uses. The ongoing mechanism should promote similar studies of the role of return flows in watersheds throughout the basin.

F. WATER QUALITY (Page 45)

1. Toxic Metals and Stream Dewatering

Proposed new storage or other management activities that could change the flow regime in the Clark Fork River must incorporate careful consideration of impacts on water quality and, particularly, toxic metal concentrations.

2. Nutrient Pollution

The ongoing basin planning and management mechanism will:

a. Encourage and assist other basin communities that have not already done so to ban the sale of phosphate detergents;
b. Continue to encourage and assist the City of Deer Lodge, the National Park Service, and the Department of Health and Environmental Sciences (DHES) in implementing this land application project, and encourage other basin communities such as Butte, Galen, Warm Springs, Drummond, and Missoula to evaluate alternatives to direct discharge of their municipal waste water; and
c. Encourage Department of Natural Resources and Conservation (DNRC) to resolve water rights questions surrounding land application.

3. Non-Point Pollution Strategy

The ongoing basin planning and management mechanism will continue to encourage upper Clark Fork basin watershed committees to participate in the development of voluntary, local non-point pollution control strategies and will provide assistance when requested and able to do so.

G. FISHERY (Page 46)

The ongoing basin planning and management mechanism will continue to provide a communications link through which the Department of Fish, Wildlife, and Parks (DFWP) and willing landowners can discuss the opportunities for leasing water, for cooperative storage projects, for implementing the trial in-stream flow program outlined in this plan, or for otherwise arranging to relieve dewatered stream sections. DFWP should continue to seek willing landowners to help solve dewatering problems to improve stream habitat improvement on private land. It will also continue to utilize River Restoration Program funds (earmarked fishing license revenue) and fish kill mitigation money (ARCO settlement in 1989 fish kill) to fund habitat improvement projects on private land.

H. IN-STREAM FLOW PILOT STUDY (Page 47)

The legislature should authorize a ten year in-stream flow pilot study in the Upper Clark Fork River Basin. The study will test allowing a public or private entity to purchase, lease, or receive by donation an existing water right from a willing seller, convert it to an in-stream right through the water rights change process, and then protect it against appropriation by junior users. To obtain and protect an in-stream right in a specific stream reach, an entity would be required to proceed through the water rights change process and demonstrate that no other water right holder would be adversely affected by the change. The pilot study will have a termination date.

The legislature should change state law so that the cost of objecting by prevailing parties in all water rights change processes will be paid by the non-prevailing party.

I. WATER RESERVATIONS (Page 49)

The legislature should continue the current suspension of Granite Conservation District's (GCD) and the Department of Fish, Wildlife and Park's (DFWP) reservation applications during the period of the proposed basin closure. The May 1, 1991 priority date for these applications previously established by the legislature should remain intact during this period. If a future basin closure review recommends either that the closure be terminated or that the exemptions be significantly modified, GCD and DFWP should retain the right to renew their reservation applications at the end of the closure period without loss of the May 1, 1991 priority date. Their renewals could include modification to their original applications if warranted by changed circumstances without loss of the May 1, 1991 priority date so long as the water quantity to be reserved does not exceed the amount in the original reservation applications and the location of the water to be reserved is not changed from the original application.

II. INTRODUCTION

A. GOALS OF THE UPPER CLARK FORK RIVER BASIN WATER MANAGEMENT PLAN

The goals of this water management plan are historic as is the plan itself:

- To provide for continued planning and management of the waters of the upper Clark Fork River Basin rooted at the local level; and
- To balance all of the basin's beneficial water uses.

The emphasis on the local level is the new ground broken by this plan and its goals. Instead of relying on a government agency with limited input from the public, this plan calls for a continued partnership between local water users and state and federal water managers to strike and maintain a balanced management of the waters of the upper Clark Fork River.

The partnership began with an agreement voluntarily negotiated by basin water users and managers, several of whom are traditional water antagonists: basin irrigators; recreational and environmental groups; state fish managers; hydroelectric utilities; water user groups; and state and local government water management agencies. It continued with the creation by the 1991 Montana Legislature of the Upper Clark Fork River Basin Steering Committee (Steering Committee), a 21 member body drawn from these same interests and with a majority membership of local basin water users or representatives of groups of local water users. It continued over a three year period during which the Steering Committee with important assistance from other local water users produced this draft plan.

The plan set forth in the following sections is historic because of the cooperative effort of local water users. This plan was conceived and developed by basin water users and managers. The plan's recommendations to Montana's Governor, Legislature, and the basin itself maintain this local focus, calling for continuation of water planning and management rooted firmly in the Upper Clark Fork River basin.

B. LEGISLATIVE MANDATE

Development of this management plan was mandated by the 1991 Montana Legislature with the passage of Senate Bill 434. This legislation, codified at MCA 85-2-335 to 338 (see Appendix A), authorized creation of the Steering Committee and directed it to write a "comprehensive water management plan" by the last day of 1994. The plan must:

a) Consider and balance all beneficial uses of the water in the Upper Clark Fork River Basin;
b) Include a description of the standards applied, the data relied upon, and the methodology used in preparing the plan;
c) Contain recommendations regarding the Upper Clark Fork River Basin closure; and
d) Identify and make recommendations regarding the resolution of water-related issues in the Upper Clark Fork River Basin.

The plan must address the area shown in Figure 1, the entire Upper Clark Fork Basin from the headwaters to the Milltown Dam located just upriver of Missoula.

Senate Bill 434 also closed the basin except for the Big Blackfoot and Rock Creek watersheds until June 30, 1995 to the issuance of most new water use permits. Permits for ground water, for domestic use of surface water, and for response or remedial actions pursuant to the federal Superfund statute were exempted from the closure. The period of the closure was set to provide the Steering Committee time to develop the basin water management plan and for the legislature to act on the plan's recommendations before the closure would end.

Senate Bill 434 was drafted to implement an agreement voluntarily negotiated by Upper Clark Fork water uses and managers. The parties to the agreement included:

- Representatives of local irrigators – Headwaters RC&D, Granite Conservation District, and the Montana Water Resources Association;
- Recreationists and environmentalists – Trout Unlimited and the Clark Fork – Pend Oreille Coalition;
- Hydroelectric utilities – Montana Power Company and Washington Water Power Company; and
- State and local government agencies – the Departments of Fish, Wildlife and Parks and Health and Environmental Sciences and the City of Missoula.

Two of these parties, GCD and the DFWP, had applied for water reservations on the Upper Clark Fork during the late 1980's. GCD had filed to reserve unallocated water for irrigation storage projects on Lower Willow Creek and Boulder Creek. DFWP had sought to reserve unallocated waters of the Clark Fork mainstem and 17 tributaries for In-stream flow. Prior to the agreement, these applicants were headed for a collision in a contested case hearing before the Board of Natural Resources and Conservation. The parties to the agreement were generally divided into two camps in support of either GCD or DFWP. However, rather than pay the expense of the hearing and risk an adverse result, the two camps entered into negotiations and reached agreement to postpone indefinitely the reservation process including the hearing, while preserving the priority dates of both GCD's and DFWP's applications in return for a temporary closure of the basin to most new water rights. During the closure, a committee broadly representative of the basin's water users and managers would attempt to develop a water management plan that would resolve the need for reservations and other basin water management issues. The parties successfully lobbied the legislature to pass legislation enacting it after reaching this agreement.

C. UPPER CLARK FORK RIVER BASIN STEERING COMMITTEE

Pursuant to Senate Bill 434, the Steering Committee was appointed by the director of the Department of Natural Resources and Conservation in October of 1991. The Steering Committee initially had 20 members; another member was added at its recommendation to provide representation of the Little Blackfoot watershed. The list of the 21 original members together with the organizations, constituencies, or area they represented are shown in Table 1. Nine members are basin irrigators or represent groups of basin irrigators. Two represent environmental/recreation organizations. Three members were elected officials from the basin at the time of their appointment, one county commissioner, one state senator and one state representative. Two represent electric utilities with dams on the Clark Fork River or its tributaries. One member represents industry. Only five members are staff of local, state, or federal government agencies.

Table 1

Upper Clark Fork River Basin
Steering Committee

Name	Organization
Joe Aldegarie	City of Missoula
Audrey Aspholm	Deer Lodge County Commission
Senator Tom Beck	Senator & Rancher from Deer Lodge
Stan Bradshaw	Montana Trout Unlimited
Rep. Vivian Brooke	Representative from House District 65 (Missoula)
Jo Brunner	Montana Water Resource Association

Table 1 continued

Jim Dinsmore	Granite Conservation District
Bruce Farling	Clark Fork - Pend Oreille Coalition
Bob Fox	Environmental Protection Agency
Holly Franz	Montana Power Company
Lorraine Gillies	Rancher & Rock Creek Advisory Council Member
Gary Ingman	DHES, Water Quality Bureau
Ronald C. Kelley	Deer Lodge Valley Water User
Land Lindbergh	Big Blackfoot River
Reed Lommen	Washington Water Power Company
Eugene Manley	Flint Creek Valley
Curt Martin	DNRC
Jim C. Quigley	Rancher - Little Blackfoot
Sandy Stash	ARCO
Ole Ueland	Silverbow Rancher
Dennis Workman	DFWP
Gerald Mueller	Facilitator

The Steering Committee was facilitated by Gerald Mueller, a contractor to the Northern Lights Research and Education Institute (Northern Lights), a non-profit organization based in Missoula. The DNRC director appointed Mr. Mueller to this position because he was the facilitator for the discussions and negotiations leading to the agreement and passage of Senate Bill 434.

Northern Lights provided the funding support for the Steering Committee almost entirely from foundation grants. Steering Committee members funded their own participation in the committee, except for some meals and mileage furnished by Northern Lights. Taxpayers supported only the staff of some of the government agencies participating on or with the Steering Committee and the publishing and distribution of the draft and final plans.

D. DEVELOPMENT OF THE MANAGEMENT PLAN

The Steering Committee developed this plan over a period of just under three years, from October 1991 through July 1994. During its first year, the Steering Committee adopted ground rules to guide its activities and heard a series of briefings about basin water issues including water law, water availability, water quality, and basin water uses. It also toured several areas of the basin including the Flint Creek and Blackfoot watersheds, the Warm Springs ponds and Butte and Anaconda federal Superfund projects, the Butte and Anaconda municipal sewage treatment plants, and the Georgetown-Silver-Storm Lake water storage and conveyance system. During the second and third years, the Steering Committee, with critical assistance of watershed committees that will be discussed in the next section, developed and executed a work plan providing for production of this plan.

E. PUBLIC INFORMATION AND INVOLVEMENT

Informing and involving the public in the basin has been a primary objective for the Steering Committee in pursuing the goal of implementing water planning and management at the local level. Public information and involvement were provided through the following mechanisms.

1. Steering Committee Meetings

All Steering Committee meetings are open to the public and noticed via the print, television, and radio media throughout the basin. Twenty-four meetings have been held to date, and the public has had the opportunity to participate freely in all of them.

2. Work Plan

The Steering Committee adopted its work plan identifying the issues to be addressed in the management plan and the process for addressing them in early after holding public meetings in Anaconda, Ovando, Drummond, Avon, Missoula, and Philipsburg. These meetings were attended by over 220 individuals. Public input included over 100 written surveys from individuals identifying the interests in water, suggestions about issues the plan should address, and [illegible] water shortages.

3. Watershed Committees

In response to the interests shown at the work plan public meetings, the Steering Committee divided the basin into six watersheds and created an ongoing committee for each. The six watersheds which are shown in Figure 2 were: the Upper Clark Fork Mainstem and Tributaries, the Lower Clark Fork, the Little Blackfoot, Flint Creek, Rock Creek, and the Big Blackfoot. The Steering Committee asked each watershed committee to:

- Assemble information and identify and make recommendations regarding issues specific to each watershed;
- Identify existing water uses and describe the existing water management system in its area; and
- Identify and recommend actions to resolve water issues in the watershed.

Each watershed committee was chaired by a Steering Committee member. Each met at night to allow local water users unable to attend the all-day Steering Committee meetings to participate in the development of the water management plan. In total, these committees met on 37 occasions and were attended by over 400 individuals during 1993 and 1994.

4. Basin Water Rights Closure Meeting

Together with the Montana Water Course, the Steering Committee held a basin-wide meeting on closure of basins to new water rights attended by some 30 individuals. The meeting provided general information about basin closure generally as well as the existing temporary closure in the Upper Clark Fork River Basin. Through discussion and a written survey completed by 26 of the meeting attendees, the Steering Committee solicited from basin water users their interest in the use of water and their views about continuing a closure in the basin and about specific conditions, such as exempted uses, duration, etc., that should be applied.

A complete listing of the types and dates of public meetings preceding the development of this plan is included in **Appendix B.**

5. Upper Clark Fork Water News

To inform basin water users who have not participated in its basin-wide or watershed committee meetings, the Steering Committee initiated a newsletter, The Upper Clark Fork Water News in the fall of 1993. Three issues have been mailed as of the summer of 1994 to all basin water rights holders living in Montana, to all people attending any Steering Committee or watershed committee meeting, and to others with an interest in water use in the upper Clark Fork identified from other mailing lists. The newsletter circulation presently exceeds 2,200 households. Topics covered in the first three issues included: an introduction to the Steering Committee and its mandate, the history leading to its creation, the Steering Committee's goal of consensus decision-making, fish habitat requirements, basin water rights closure, irrigation return flows, hydropower generation on the Clark Fork River, water storage, the Steering Committee's proposed approach to its legal mandate to balance beneficial water uses, and a proposal to use the effluent from the Deer Lodge waste treatment plant as irrigation water rather than discharging it into the Clark Fork River. Each issue also updated readers on the status of the development of the water management plan and introduced two or more Steering Committee members. The newsletter will be used as an executive summary of both the draft and final basin water management plans.

III. EXISTING SITUATION

A. MONTANA WATER LAW

1. Water Right Basics

Montana's legal framework for water rights is referred to as the prior appropriation doctrine. There are two general rules in the prior appropriation doctrine. These rules are expressed by the following easy to remember rhymes: "first in time, first in right" and "use it or lose it."

"First in time, first in right" relates to the priority date of a water right. The priority date of a water right generally refers to the date on which the water was first put to beneficial use. The earlier the priority date, the better the water right. A senior water right holder with an earlier priority date is entitled to use the full amount of his or her water right before any junior water right holder can use any water. In times of shortage, the senior water right can take all of the available water. There is no requirement that water be shared among the various users.

"Use it or lose it" refers to the requirement of beneficial use. A water right is not ownership of the water itself, but it is the right to use water beneficially. For example, if someone has the right to divert water for irrigation but is haying and does not currently need the water for beneficial use, he or she cannot continue to divert the water but must leave it in the stream for use by junior water rights holders. When water is no longer put to a beneficial use, it can be lost or abandoned. It typically takes at least 10 years of non-use for the issue of abandonment to arise. Beneficial use is the "basis, measure, and limit" of a water right. In other words, if someone claims a water right for 200 miner's inches but has historically used only 100 miner's inches, that person's water right is only for the 100 miner's inches put to beneficial use.

While the basic rules of Montana water law are fairly simple, their actual application often becomes complicated. This section does not attempt to explain all of the nuances of Montana water law. A few selected topics, however, with particular application to the Upper Clark Fork River Basin are described below.

2. Water Reservations

In 1973, the Montana legislature enacted the Water Use Act which drastically changed Montana's existing water law. While the basic rules of "first in time, first in right" and "use it or lose it" were retained, the Water Use Act added a number of new twists. The Water Use Act created a new type of water right referred to as a water reservation. Water reservations are available only to public entities, such as conservation districts, municipalities, and state and federal agencies.

Water reservations are different from traditional water rights in two key ways. First, traditional water rights could only be acquired if water was diverted or impounded. Before 1973, water rights could not be acquired for in-stream flows (with the exception of the Murphy Rights which are explained below). Water reservations, however, can be used for in-stream flows. In-stream flow water reservations have been issued to entities such as the DFWP and the DHES to maintain fisheries and dilute pollution. Second, due to the requirement of beneficial use, traditional water rights had to be put to use within a reasonable time or they were lost. Water reservations, on the other hand, can reserve water for the future needs of irrigation districts, municipalities, and other public entities.

The GCD and DFWP filed applications for water reservations in the Upper Clark Fork River Basin. The application filed by the GCD seeks to construct, at some point in the future, a dam on the North Fork of Lower Willow Creek to provide supplemental irrigation water and a dam on Boulder Creek to irrigate new acres. The application filed by DFWP seeks in-stream flows in the mainstem of the Clark Fork River and 17 of its tributaries. DFWP did not apply to reserve water on the Blackfoot River or Rock Creek. Both of these applications were scheduled to go to a hearing in 1991.

The 1991 Montana legislature temporarily suspended action on the GCD and DFWP water reservation applications until June 30, 1995 while the Upper Clark Fork River Basin comprehensive management plan is being written. The draft management plan recommends that the reservation applications continue to be suspended as long as the basin is closed to most new water uses.

If the reservation process is not suspended, it will proceed forward and a formal contested case hearing will be held on the applications and objections. The ultimate decision whether or not to grant the reservations is made by the Board of Natural Resources and Conservation. The board's decision can be appealed to the District Court and then to the Montana Supreme Court. Any reservation granted to the GCD or DFWP will have a priority date of May 1, 1991.

3. Basin Closure

Since the passage of the 1973 Water Use Act, a person cannot receive a new right to use water without first applying for and receiving a water use permit from DNRC. Before DNRC can issue a water use permit, the applicant must prove, among other things, that there is unappropriated water available for the new use and the new use will not adversely affect existing water rights. A basin closure essentially predetermines these issues and declares there is no water legally available for new uses, and therefore no reason to continue the permit process.

A basin closure prevents DNRC from issuing new water use permits. However, it does not affect the ability to change existing water rights. Basin closures are designed to protect existing water right holders by prohibiting new junior water uses and by eliminating the need to spend time and money objecting to proposed new uses on streams which are already over appropriated.

A basin may be closed by DNRC or by the legislature. The Upper Clark Fork River Basin was closed by the 1991 Legislature. This closure does not apply to the Blackfoot River or Rock Creek. A basin closure does not have to be permanent. The basin closure in the Upper Clark Fork lasts until June 30, 1995. The draft management plan recommends the basin closure be extended to include the Blackfoot River and Rock Creek and that it continue indefinitely with periodic reviews.

A basin closure also does not have to apply to all water uses. For example, the current basin closure in the Upper Clark Fork Basin does not apply to groundwater, water for domestic use, or water used in the Superfund Cleanup. This plan recommends that stockwater, storage, nonconsumptive, and limited Superfund uses of water be exempted from the closure.

4. Changes to Existing Water Rights

Montana water law has always allowed changes to be made to existing water rights and water rights to be severed from the land. Since 1973, all changes must be pre-approved by the DNRC. Before a change can occur, the applicant who is proposing to change an existing water right must prove there will be no adverse affect to other water rights holders. If objections are filed against a proposed change, DNRC holds a contested case hearing before deciding whether to authorize the change. DNRC's decision can be appealed to the District Court and then to the Montana Supreme Court.

The most common example of a water right change is moving a water right's point of diversion. Another example of a change may occur when irrigated farm land is subdivided. The water right appurtenant to the subdivided land may be severed and sold to a neighboring irrigator. This example involves changes in the place of use and perhaps the point of diversion or place of storage. Before these changes could be authorized, DNRC must determine whether the proposed change will increase the amount of water historically consumed by the water right. To do this, DNRC considers the amount of water historically diverted, the efficiency of the irrigation system and means of delivery, the amount of water consumed by the crop, and the amount of return flow. DNRC must calculate both historic water consumption and the expected consumption under the proposed change. If the proposed change will consume more water, it will be denied. The applicant has the burden of proving that consumption will not increase and no other water rights will be adversely affected.

5. In-stream Flows

In-stream flows can be protected using a number of different methods. This section refers only to in-stream flows for maintaining fisheries. The first method is referred to as a Murphy Right. Representative Murphy was the sponsor of legislation passed in 1969 which allowed DFWP to appropriate water on 12 Blue Ribbon trout streams. In the Upper Clark Fork River Basin, DFWP has Murphy Rights on the mainstem of the Blackfoot River from its mouth to the mouth of its North Fork, and on the mainstem of Rock Creek from its mouth to the junction of its east and west forks. The priority date for these Murphy Rights is January 1971. The amount of water claimed by DFWP for these Murphy Rights depends on the time of year and largely follows the streamflow hydrograph.

The second method is a water reservation. To date, in-stream flow water reservations have been granted in the Yellowstone River Basin and in the Upper Missouri River Basin above Fort Peck Dam. As described above, DFWP's in-stream flow water reservation application for the Upper Clark Fork River Basin is temporarily suspended. DFWP did not apply for a water reservation on the Blackfoot River or Rock Creek because it already has Murphy Rights on those streams.

The third method is a water lease. The 1989 Legislature created a temporary program allowing DFWP to lease existing water rights for in-stream flow purposes. The leases are restricted to 20 designated streams. Most leases can last no more than 10 years, renewable once for an additional 10 years. If, however, the leased water is made available through the development of a water conservation or storage project, the lease can last twenty years.

Before a lease can go into effect, it must go through the change process, and DFWP must prove there will be no adverse affect to other water rights. If a lease is approved, DFWP can protect the full amount of the leased water right to its point of diversion, but downstream from the point of diversion DFWP can only protect the amount of water which was historically consumed. To date, DFWP has entered into two leases on Mill Creek, a tributary to the Yellowstone River., and on Blanchard Creek, a tributary to the Clearwater River in the Big Blackfoot watershed. Several other leases have been negotiated but not finalized. Of the seven streams which have been designated for leasing, only one, Blanchard Creek, is in the Upper Clark Fork River Basin. Blanchard Creek is a tributary to the Clearwater River, which is a tributary of the Blackfoot River. No objections were filed against the change applications for the Mill Creek and Blanchard Creek leases, and the changes have been authorized by DNRC.

This plan proposes a pilot project to test another method of obtaining a water right for In- stream flow. The pilot project would allow the sale of existing water rights to private or public entities for in-stream flows, and provide additional protection to prevent adverse affects to other water rights.

6. Adjudication

All water rights with a priority date before July 1, 1973, except for some domestic groundwater and stockwater rights, are currently being adjudicated by the Montana Water Court. The adjudication involves a number of different stages including the filing of water right claims, verification of those claims by DNRC, the issuance of a temporary preliminary decree followed by the filing of objections and the holding of hearings, the issuance of a preliminary decree followed by another round of objections and hearings, and the issuance of a final decree.

The adjudication began with the filing of claims for pre-July 1, 1973 water rights. All water right claims were to be filed by April 30, 1982. The 1993 Legislature set a new deadline, July 1, 1996, for the filing of additional water right claims. Any water right claim filed after April 30, 1982 is subject to special restrictive rules. If a water right claim is not filed by July 1, 1996, the water right will be forfeited.

After the water right claims are filed, the next stage in the adjudication is verification. In this stage, DNRC reviews or verifies all of the water right claims and indicates any perceived problems with the claims. For example, DNRC may indicate that a claim includes more acres than appear to be actually irrigated.

After verification, the Water Court combines the water right claims and DNRC's verification comments into a temporary preliminary decree. The temporary preliminary decree includes all of the water rights in a basin except for federal and tribal reserved water rights. After the issuance of a temporary preliminary

decree, there is a period for filing objections against the various water right claims. If a water user does not want to formally object, but wants to participate in the adjudication of a particular claim, the water user may file a notice of intent to appear. After the deadline expires for filing objections and notices of intent to appear, the water court begins to resolve the various objections. If an objection cannot be resolved between the parties, the water court will hold a hearing and rule on the validity of the contested water right.

While all of this is going on in the water court, the State of Montana, through the Montana Reserved Water Rights Compact Commission, is attempting to negotiate the extent of federal and tribal reserved water rights with the federal government and the tribes. At some point, either through successful negotiation or through recognition that negotiation will not work, the federal and tribal reserved water rights will be combined with the other water rights in the basin, and a preliminary decree will be issued. Objections can then be filed against water right claims contained in the preliminary decree. Notices of intent to appear can also be filed. After the objections and notices of intent to appear are filed, the water court will once again proceed to resolve the objections through hearings, if necessary. Once all of the objections to the preliminary decree are resolved, a final decree is issued and the adjudication is complete.

The adjudication is in various stages of completion throughout the Upper Clark Fork River Basin. The basin has been divided into four subbasins for the purposes of the adjudication. The four subbasins are Basin 76GJ, which includes Flint Creek and its tributaries; Basin 76E, which includes Rock Creek and its tributaries; Basin 76F, which includes the Blackfoot River and its tributaries,;and Basin 76G, which includes the Clark Fork River above Milltown Dam and all of its tributaries except for the Blackfoot River, Flint Creek, and Rock Creek.

A temporary preliminary decree was issued for Basin 76GJ (Flint Creek) on March 29, 1984. Objections to the temporary preliminary decree had to be filed by September 3, 1984. Notices of intent to appear had to be filed by December 31, 1984. According to the Water Court, most of the objections to the temporary preliminary decree have been resolved. One of the remaining unresolved objections was filed by the Confederated Salish and Kootenai Tribes against general language in the decree. Another unresolved objection was filed by the U.S. Government concerning its claims for certain groundwater wells. In addition, the resolution of a few water rights, such as the Montana Power Company's water right for storage at the Flint Creek Dam, have been stayed and will not be immediately decided.

A temporary preliminary decree was issued for Basin 76E (Rock Creek) on March 29, 1984. Objections to the temporary preliminary decree had to be filed by August 20, 1984. Notices of intent to appear had to be filed by November 23, 1984. According to the Water Court most, if not all, of the objections to the temporary preliminary decree have been resolved.

No decrees have been issued for Basin 76F (Blackfoot River). The Water Court has not set a date for the issuance of a temporary preliminary decree. Before a temporary preliminary decree can be issued, the Missoula DNRC Regional Office must review and verify all of the filed water right claims. The Missoula Regional Office is currently working on the southern Bitterroot River and will not begin to verify the Blackfoot River for a number of years.

A temporary preliminary decree was issued for Basin 76G (Upper Clark Fork) on May 17, 1985. Objections to the temporary preliminary decree had to be filed by December 17, 1985. Notices of intent to appear had to be filed by April 22, 1988. Water rights are, and have always been, vigorously disputed in this basin. These disputes, along with personnel turnover in the water court, have slowed down the adjudication of this basin. Water Master Kathryn Lambert has been assigned to adjudicate Racetrack and Dempsey creeks. Water Master Doug Ritter is currently working on objections in the Little Blackfoot drainage. The other streams have been assigned to either Chief Water Judge C. Bruce Loble or another water master.

Once all of the objections to a temporary preliminary decree have been resolved, the next step in the adjudication process is to issue a preliminary decree. Preliminary decrees will include federal and tribal reserved water rights, such as those claimed by the U.S. Forest Service and the Confederated Salish and Kootenai Tribes. At this time, there are no ongoing negotiations specifically addressing federal and tribal reserved water rights in the Upper Clark Fork River Basin. The Montana Reserved Water Rights Compact Commission is negotiating with the U.S. Forest Service to determine how to address the many issues raised by the Forest Service's reserved water right claims throughout the state. There has been no discussion of

the Forest Service's reserved water rights in particular basins. The current deadline for completion of the Compact Commission's negotiations is July 1, 1999. This deadline may or may not be extended. Due to the complication of federal and tribal reserved water rights, it will likely be many years before any preliminary decrees are issued in the Upper Clark Fork River Basin.

7. Enforcement of Water Rights

Montana follows the prior appropriation doctrine. One of the basic rules of the prior appropriation doctrine is "first in time, first in right." A senior water right user with an earlier priority date is entitled to be fully satisfied before any junior water right user can appropriate water. In times of water shortage, the senior water right holder can take all of the water. As a result, the priority date is usually the most important part of a water right.

Despite the value of an early priority date, it is not always easy to enforce the priority of a water right. In Montana, enforcement is generally the responsibility of the individual water right holder. If any type of legal action has to be filed, or a water commissioner has to be hired, the individual water right holders must pay the costs.

One method to enforce water rights is the appointment of a water commissioner. A water commissioner can only be appointed on decreed streams, usually those streams which were decreed by district courts in the early 1900s. Many tributaries in the Upper Clark Fork River Basin have been decreed and have water commissioners appointed every year. A water commissioner distributes water according to the priorities in the decree. A water commissioner is usually appointed by the district judge at the request of a petition signed by the water users. The cost of the water commissioner is paid by the water users pro rata based on the amount of water they use.

The mainstem of the Upper Clark Fork River and a good number of its tributaries have not been decreed. Since there is no decree, a water commissioner cannot be appointed. Once all of the objections to a temporary preliminary decree have been resolved by the water court, a water commissioner can be appointed to distribute water in accordance with the temporary preliminary decree.

Enforcing a nondecreed water right is generally more difficult than a decreed water right. There are, however, a number of methods which can be used to enforce both decreed and nondecreed water rights. One method is to make a call on a junior water right holder. A call is made by instructing the junior user to stop taking water so that the water can be used by a senior user. Many water rights are enforced through voluntary compliance with calls made by senior users. If, however, a call is made and the junior water user refuses to stop using water, the senior user may have to go to court and seek an injunction ordering the junior user to stop taking water. This can be an expensive, time consuming process.

A relatively new enforcement method is to seek enforcement by DNRC. Before contacting DNRC for enforcement, the senior water user must make a call on the junior users. If a junior user refuses to honor the call, the senior user should document this through photographs or other methods. The senior user can then contact DNRC. DNRC will first attempt to obtain voluntary compliance. If the junior user does not voluntarily comply within three working days, DNRC can seek a $1,000 penalty per day for each day that the violation continues.

Another new enforcement method is to seek the appointment of a water mediator. Water mediators can be appointed by a district court judge upon the judge's discretion, upon the request of the governor, or by petition of at least 15 percent of the owners of the affected water rights. A water mediator has no authority to impose a settlement on the parties, but may assist the parties in agreeing how water is to be used. If no agreement is reached, the parties are free to pursue any other means of enforcing their water rights.

B. WATER QUALITY STANDARDS

1. Definition and Purpose

The Montana Water Quality Act is the foundation for the state's water pollution control program. The Act states: "It is the public policy of this state to: (1) conserve water by protecting, maintaining, and improving the quality and potability of water for public water supplies, wildlife, fish and aquatic life, agriculture, industry, recreation, and other beneficial uses; and (2) provide a comprehensive program for the prevention, abatement, and control of water pollution." (Section 75-5-103 MCA, revised 1991). The Water Quality Division of the Montana Department of Health and Environmental Sciences is responsible for the administration of the Montana Water Quality Act.

The Act requires that our state waters be maintained and protected as multiple-use resources. When state waters are used for a beneficial purpose, the quality in which they are returned after use must not impair the receiving water's assigned beneficial use. This important water quality protection requirement necessitates wise water use management and wastewater treatment practices.

Public water supply and other domestic purposes; industrial water supply; agricultural use; recreation and fish, wildlife, and other aquatic life needs have been recognized as legitimate beneficial uses of state waters important to our quality of life. Enforceable water quality standards are the yardstick used in protecting waters. The standards designate specific water use classifications for all surface and groundwater in the state and establish criteria for protecting and improving their quality and potability. The standards also establish waste treatment requirements and serve as a frame of reference for determining the occurrence of water pollution. Water pollution is regarded as any contamination or other alteration of the physical, chemical, or biological properties of any state waters which exceeds the water quality standards or impairs a prescribed beneficial use.

Montana's water quality standards for surface waters are a combination of drinking water, aquatic life, and water and fish ingestion numeric standards, as well as the prohibition of specific practices that degrade water quality. Surface water quality standards and prohibited practices are defined in the Administrative Rules of Montana (ARM) as adopted by the Montana Board of Health and Environmental Sciences (ARM 16.20.601 et seq., revised June 1988).

For groundwater, the applicable standards are currently limited to the primary drinking water standards established by the Environmental Protection Agency under the Safe Drinking Water Act. Montana has adopted these standards for all groundwater in the state (ARM 16.20.1003). Rule changes are anticipated in 1994 that will add additional human health-based standards for pollutants in groundwater.

The Nondegradation Rules are a part of the water quality standards that apply to new or increased sources of pollution. These rules prohibit increasing concentrations of toxic and deleterious materials in state waters, unless it is affirmatively demonstrated to the Department of Health and Environmental Sciences that a change is justifiable as a result of necessary economic or social development and will not preclude present or anticipated uses of these waters.

2. Clark Fork Basin Water Quality Standards Designations

Surface waters in the upper Clark Fork Basin are classified as A, B, C, or I class waters (ARM 16.20.604). Each of these classes of water is defined in the standards as being supportive of various beneficial uses, and containing at least the minimum level of water quality necessary to support those uses. Water use descriptions for different water classifications in the upper Clark Fork Basin and the corresponding surface waters of the basin falling within those classes are described in Table 2. Table 3 shows total stream miles and lake acres in the upper Clark Fork Basin designated as suitable for the various beneficial uses prescribed in the standards.

Table 2. Water use classifications and corresponding definitions for surface waters of the upper Clark Fork Basin. Source: Montana Surface Water Quality Standards, Administrative Rules of Montana, Title 16, Chapter 20.

16.20.616 A-CLOSED CLASSIFICATION: Waters classified A-Closed are suitable for drinking, culinary and food processing purposes after simple disinfection. Water quality is suitable for swimming, recreation, growth and propagation of fishes and associated aquatic life, although access restrictions to protect public health may limit actual use of A-Closed waters for these uses. A-Closed waters in the upper Clark Fork Basin include: the Yankee Doodle Creek drainage to and including the North Butte water supply reservoir, the Basin Creek drainage to and including the South Butte water supply reservoir, the Tin Cup Joe Creek drainage to the Deer Lodge water supply intake, and Fred Burr Lake and its headwaters from its source to the outlet of the lake (Philipsburg water supply intake).

16.20.617 A-1 CLASSIFICATION: Waters classified A-1 are suitable for drinking, culinary and food processing purposes after conventional treatment for removal of naturally present impurities. Water quality must also be suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. A-1 waters in the upper Clark Fork Basin include: the Warm Springs Creek drainage to Myers Dam near Anaconda, Georgetown Lake and its tributaries above Georgetown Dam (headwaters of Flint Creek drainage), and the South Boulder Creek drainage to the Philipsburg water supply intake.

16.20.618 B-1 CLASSIFICATION: Waters classified B-1 are suitable for drinking, culinary and food processing purposes, after conventional treatment; bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. All of the Clark Fork River and its tributaries except those reaches classified as A-Closed, A-1, C-1, or C-2 are classified as B-1 waters.

16.20.621 C-1 CLASSIFICATION: Waters classified C-1 are suitable for bathing, swimming and recreation; growth and propagation of salmonid fishes and associated aquatic life; waterfowl and furbearers; and agricultural and industrial water supply. The Clark Fork River mainstem from Cottonwood Creek (near Deer Lodge) to the Little Blackfoot River is classified C-1.

16.20.622 C-2 CLASSIFICATION: Waters classified C-2 are suitable for bathing, swimming and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. The Clark Fork River from Warm Springs Creek to Cottonwood Creek is classified C-2.

16.20.623 I CLASSIFICATION: The goal of the State of Montana is to have these waters fully support the following uses: drinking, culinary and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. Silver Bow Creek from the confluence of Blacktail Deer Creek to Warm Springs Creek is classified I. Although Silver Bow Creek currently cannot support most of the above-mentioned uses, the goal is to gradually improve water quality. An analysis will be performed during each standards review period to determine the factors preventing or limiting the attainment of these uses. Permittees who discharge to Class I waters cannot degrade water quality below existing conditions.

Table 3. Total stream miles * and lake acres ** in the upper Clark Fork Basin classified according to the various uses prescribed in the Montana Surface Water Quality Standards.

	Total Size Classified for Use	
Classified Use	**Stream Miles**	**Lake Acres**
Fish and Wildlife	4427 a	14919
Domestic Water Supply	4389 b	14919
Recreation	4427 a	14919
Agriculture	4412	14769
Industrial	4412	14769

* Includes perennial stream miles only. Excludes 3819 miles of intermittent streams and 302 miles of ditches and canals.

** Includes 421 lakes, reservoirs and ponds in excess of 5 acres size.

a Includes 33.2 miles of I Class stream (Silver Bow Creek) where this use is a goal.

b Excludes 37.8 miles of the Clark Fork River classified C-1 and C-2, which are not considered suitable for drinking, culinary and food processing purposes; includes 33.2 miles of I stream (Silver Bow Creek) where domestic water supply is a goal but not an existing use.

C. BASIN HYDROLOGY

"Hydrology" is the study of how water enters, flows through, and departs from a given area. The Upper Clark Fork Basin is an area of about 6,000 square miles draining the western slope of the Northern Rockies. It is defined for purposes of this plan as all the drainage area above Milltown Dam. The area is primarily mountainous and forested, with several interspersed valleys that accommodate the most intensive human land and water uses. Elevations range from over 10,600 feet above mean sea level on the southern boundary in the Pintler Wilderness to about 3,250 ft. at Milltown Dam.

Because the Upper Clark Fork is a "headwater" drainage, almost all of the water entering the basin does so as rain and snow. Average annual precipitation varies from a little over 10 inches in the upper Deer Lodge valley to over 60 inches on some peaks on the northern boundary of the Blackfoot Basin.

The average annual volume of water leaving this area through the river is about 2.1 million acre-feet, based on USGS records dating back to 1929 (Montana Power Company has records prior to 1929 for Milltown Dam). The maximum yearly outflow during the 1929 to 1993 period was 3.7 million acre-feet (af) in 1976, and the minimum was .97 million af in 1941. The highest recorded instantaneous flow was 48,000 cubic feet per second (cfs) recorded by MPC in 1908, and the lowest is 115 cfs in 1943. Although these extremes underscore the variation of flows, by Montana standards the Upper Clark Fork is a fairly stable stream, particularly below the confluence of Rock Creek and the Blackfoot River.

Understanding what water enters and leaves the Upper Clark Fork on average, is the easy part of understanding the basin's hydrology. More difficult (and more relevant for the people who live there) is understanding the influences on the amount and distribution of water "flowing through it." When considering

streamflows in this region, it is also important to recognize that averages are statistical creations seldom experienced. Flows vary significantly by year and by season, and it is the low probability events for which people must plan and manage their water uses.

This narrative follows the common conception that water occurs and flows through the basin either under or across the surface of the land. It is important to recognize, however, that this distinction is artificial. Surface water becomes groundwater, and groundwater becomes surface water. When someone affects surface water supplies or quality, secondary effects are likely to be seen in time to groundwater, and vice versa. Unfortunately, the linkages between surface and ground water are seldom understood sufficiently to be precisely quantified.

1. Groundwater

Groundwater occurs in the pore spaces, fractures, and voids in rock, soil, and sediment formations throughout the Upper Clark Fork Basin. Typically, groundwater is thought of in terms of aquifers with defined boundaries, but groundwater also includes shallow, vagrant soil moisture that will rejoin surface or groundwater or be taken up by the roots of plants.

The aquifers of the Upper Clark Fork can be subdivided into four categories described in greater detail below: 1) bedrock aquifers, 2) tertiary basin fill aquifers, 3) glacial aquifers, and 4) alluvial aquifers. Again, remember that these categories are not completely distinct. Water may move between them although the time frames involved in doing so may be great.

In general terms, groundwater originates from water infiltrating the ground from snow, rain, and streams. Groundwater tends to move from highlands to low areas, where it often discharges to streams and springs, is used by plants, or evaporates. The movement, amount, and quality of groundwater at any location depends on the type, structure, and hydraulic properties of the rocks, soils or sediments present, and on the climate, landforms, and other natural features. To a lesser extent than surface water, it is also influenced by human activities.

a. Bedrock Aquifers

Bedrock is a term used to describe solid rock, commonly covered by soil or other uncompacted materials such as sand, gravel, and clay. Bedrock forms the core of all mountainous areas of the basin, and is present deep below younger deposits in valleys. In the Upper Clark Fork Basin, the most common types of bedrock are: Precambrian age (more than 570 million years old) metasedimentary rocks; Paleozoic and Mesozoic age (about 65 million to 570 million years old) marine and terrestrial sandstones, shales, and carbonate rocks; and igneous rocks of various ages. The water bearing capacities of bedrock formations depends on whether the rock is porous, fractured, or cavernous. The source of groundwater recharge in these aquifers is largely from infiltrating water from mountain snowpack and precipitation. Water quality is usually very good.

The Precambrian metasedimentary rocks are typically highly compacted, nonporous rocks that are fractured. These extremely old rocks have been deeply buried, subjected to considerable heat and pressure (hence the term metasedimentary), and later uplifted and moved during mountain building processes. These rocks include the maroon, pale green, and lavender hardened siltstones (argillites) visible in rock outcrops in Hellgate Canyon and forming Mount Sentinel east of Missoula. These rocks, known to geologists as Belt rocks, are among the oldest in the world in which sedimentary features such as bedding planes, ripple marks, and even casts of salt crystals are preserved. The Sapphire Mountains, the Mission Mountains, the Swan Range, and northern parts of the Garnet Range are underlain largely by Belt rocks. Belt rocks are not very porous, and groundwater occurs principally in fractures. Well yields are variable, but generally small, ranging from 1 to 35 gallons per minute (gpm).

Paleozoic and Mesozoic age marine and terrestrial rocks occur mainly in southern parts of the Garnet Range and along the flanks of the Flint Creek Range. These rocks were warped, folded and sheared by mountain forces. Their water bearing capacities are dependent on the type of rock, degree of fracturing, geologic structure, and topographic setting. Limestone and sandstone formations are typically moderate

to good aquifers, while shale formations may yield little or no water. Well yields are variable, ranging from 5 to 100 gpm. A particularly thick sequence of fractured and cavernous limestone and dolomite formations known as the Madison Group is an unusually productive aquifer that is found in some parts of the basin.

Igneous rocks include volcanic rocks (molten rock that solidified at or near the surface) and plutonic rocks (molten rock that solidified at depth). The core of the Garnet Range, some areas west of Flint Creek, the mountains east of Deer Lodge, and the Highland Mountains south of Butte contain large areas of volcanic rock. Plutonic rocks, largely granite, form the core of the Flint Creek Range and the mountains east of Deer Lodge. Like Belt rocks, groundwater occurs principally within fractures. Well yields average as little as 2 to 5 gpm.

b. Tertiary Basin Fill Aquifers

In geologic time, the period lasting from 2 million to 65 million years ago is called the Tertiary Age. At the onset of this period, the major tectonic activities that form much of the regional landscape were taking place. Climate changes were extreme during this period, varying from times of abundant water, warm temperatures, and lush vegetation to times of very dry conditions. Volcanoes were active in the Upper Clark Fork.

During much of the Tertiary Age, mountainous areas were eroded and sediments accumulated in the wider valleys of the basin, including the Silver Bow, Deer Lodge, Flint Creek, Philipsburg, Blackfoot, and Nevada Creek valleys. The deposited sediments consist of uncompacted or poorly compacted clay, silt, sand, and gravelly materials in horizontal to slightly tilted layers. They also include beds of volcanic ash. Through geophysical studies and scant drillhole data, it is estimated that these materials are nearly 12,000 feet thick in central portions of the larger valleys.

The water yield of Tertiary fill sediments in the basin vary from 5 to 35 gpm, although drilling a dry hole is not an unexpected occurrence. In some areas of the basin thick, gravelly saturated sediments have provided enough water to operate large sprinkler irrigation systems. Water enters the Tertiary sediments via seepage from streams, overlying alluvial aquifers, precipitation, and irrigation activities. Water quality depends on the location and depth of the well, the types of sediments present, and the proximity to fresh water recharge sources. Water quality is fair to good for domestic and stockwater purposes, but may be susceptible to degradation by human activities.

c. Glacial Aquifers

Many of the higher, more rugged mountainous areas were glaciated during the ice ages which lasted from about 10,000 to 2 million years ago. Large sheets of ice extended into the Blackfoot Valley (especially the Clearwater Junction and Ovando areas) from the north. The glaciers carved large amounts of material from surrounding landscapes and transported it downhill. The deposits left by these glaciers are complicated mixtures of poorly sorted debris (glacial till), gravelly outwash, and glacial lake sediments. The water bearing properties are as variable as the nature of the deposits. They yield good quality water for wells in limited portions of the Upper Clark Fork Basin.

d. Alluvial Aquifers

Alluvium consists of loosely compacted gravel, sand, silt, and clay deposited by streams. These sediments are present beneath the flood plains of streams and are layered and highly variable from one location to another within the floodplain. Alluvial aquifers are excellent water sources and the most extensively used aquifer type in the Upper Clark Fork Basin. Water yields in alluvial sediments can be very large, as much as 1,000 gpm or more in a properly designed, large diameter well.

Groundwater in alluvial aquifers is hydraulically connected to streams, and water levels and movement are affected by stream conditions. The relationships between alluvial groundwater and streams can be complicated and vary both by location and time. Some stream reaches may always gain water from adjacent alluvial aquifers while other reaches always lose water. In many areas the relationship shifts due to natural

or human induced conditions, including seasonal variations in precipitation and streamflow, irrigation activities, groundwater withdrawals, and wastewater treatment. Because of the shallow nature of alluvial sediments, shallow water depths, and concentrated human populations in the valleys, alluvial aquifers are particularly susceptible to contamination.

2. Surface Water

Surface water flows in the Upper Clark Fork are dominated by snowmelt. In an average year, about 24 percent of the annual runoff occurs in June, 22 percent in May, 10 percent in April, and 9 percent in July. The other eight months contribute between three and five percent each. The periods of greatest consumptive demand for water do not coincide exactly with when water is available. The critical months, when demands put the greatest pressure on supplies, are July and August.

The amount of water varies over time within the Upper Clark Fork Basin, but also varies from place to place. For this reason, more specific hydrologic information is presented below by six watersheds that together comprise the larger surface water picture. The total outflows and monthly averages are based on USGS recorded flows for the 14-year period of record from October 1, 1978 through September 30, 1992. This period was a somewhat drier than average periods of the same length from recent history.

a. Upper Clark Fork Mainstem and Tributaries

This watershed includes several significant tributaries including Silver Bow Creek, Warm Springs Creek, Lost Creek, Racetrack Creek, Dempsey Creek, Tin Cup Joe Creek, and Cottonwood Creek. It comprises about 1,100 square miles (sq. mi.), or 18.3 percent of the total Upper Clark Fork, but contributes only about 11.8 percent of the total average flow. In other words, it is one of the drier and most heavily water-depleted areas in the basin. At Deer Lodge, the average monthly flow of the mainstem in July is 205 cubic feet per second and 94 cfs in August. The lowest recorded daily average flow at this site was 22 cfs on August 18, 1988, while the highest daily average was 2,390 cfs on May 23, 1981.

b. Little Blackfoot River

The Little Blackfoot watershed is a little over 400 sq. mi., or 6.7 percent of the basin. It yields 5.5 percent of the basin outflow. At its mouth, the average monthly flow in July is 120 cfs, and in August is 51 cfs. Major tributaries are Dog Creek, Snowshoe Creek, Spotted Dog Creek, and Threemile Creek. On August 21, 1988 the recorded flow was only 10 cfs, while the peak recorded discharge was 6,280 cfs on May 21, 1981.

c. Flint Creek

The Flint Creek watershed is almost 500 sq. mi., or 8.3 percent of the total basin. Water is diverted from the East Fork of Rock Creek in the Rock Creek watershed to the Flint Creek watershed. Major tributaries of Flint Creek are Trout Creek, Fred Burr Creek, Marshall Creek, Boulder Creek, Douglas Creek, and Lower Willow Creek. Flint Creek is the most heavily developed watershed in the basin for irrigation.

There is no long-term flow measurement station at the lower end of Flint Creek, so the outflow is estimated to be 5 percent of the total average annual flow at Milltown Dam based on measurements of the Clark Fork above and below the Flint Creek confluence. Based on this estimate, the average July flow is 130 cfs and for August, 67 cfs. The lowest daily mean would be 22 cfs, and the highest daily average would be 1,650 cfs.

d. Rock Creek

Rock Creek contributes about 18 percent of the total basin flow while comprising only about 15 percent of the basin's total area, not counting the flows its exports to Flint Creek. It's major tributaries are the East Fork, Middle Fork, Ross Fork, West Fork, and Willow Creek, although it has numerous other perennial tributaries. Average monthly flows are 595 cfs for July and 285 cfs for August. The lowest

recorded daily average flow was 45 cfs on February 4, 1989. The highest daily average flow was 5,330 cfs on June 20, 1975.

e. Blackfoot River

The Blackfoot River's drainage area is about 38 percent of the total basin, but it provides about 52 percent of the total flow at Milltown Dam. The flow of the Blackfoot River is actually larger than that of the Clark Fork River at its confluence with the Clark Fork River. Major tributaries include Nevada Creek, Douglas Creek, Monture Creek, Clearwater River, Elk Creek, Union Creek, and Gold Creek, to name but a few of the major perennial streams. July average monthly flows are 1,485 cfs; for August the figure is 730 cfs. The highest daily average flow at Bonner was 18,000 cfs on June 10, 1964. The lowest daily average was 200 cfs on January 4, 1950.

f. Lower Clark Fork Mainstem

This watershed includes all the area that drains into the Clark Fork mainstem between the mouths of the Little Blackfoot and Big Blackfoot rivers, exclusive of Flint Creek and Rock Creek. Significant tributaries include the "other" Rock Creek, Gold Creek, Hoover Creek, Harvey Creek, and Bear Creek. This area comprises about 13.7 percent of the basin total, but generates only about 8 percent of the total outflow. It is lower in elevation, receives less precipitation, and would be expected to generate less water. Average July flows above the Big Blackfoot are 1,300 cfs. August average flows are 630 cfs. The average monthly accretion of flows to this section of the river (excluding contributions from the Upper Clark Fork Mainstem, Little Blackfoot, Flint Creek, and Rock Creek watersheds) are 350 cfs in July and 133 cfs in August.

D. WATER QUALITY

The Clark Fork is Montana's largest and perhaps most abused river. Beginning as a small stream at the confluence of Silver Bow and Warm Springs creeks in the Deer Lodge Valley, the Clark Fork River rapidly gains size and volume from the inflows of numerous tributaries in its 22,000 square mile drainage area. Its average discharge at the Montana–Idaho border is 22,060 cubic feet per second (cfs); flows as large as 153,000 cfs have been recorded. Just across the Idaho border, the river provides greater than 90 percent of the inflow to Pend Oreille Lake, a very deep and scenic natural lake that is an important recreational and economic asset to northern Idaho.

More than a century of mining and smelting, agriculture and timber harvesting, hydropower development, and population growth have impacted water quality in Clark Fork River in Montana. The upper river has long been polluted with toxic metals, sediment, and nutrients and has been subject to significant dewatering. The consequences to the upper river are impaired fisheries, excessive developments of river algae, and a contaminated public water supply.

In the middle Clark Fork River, from Milltown Dam to the Flathead River, water quality is much improved. However, the more subtle effects of municipal and industrial wastewater discharges to this reach are cause for concern. The middle river is enriched with nutrients and dissolved oxygen levels periodically fall below state standards. Trout population densities are lower than the river's potential and aesthetic problems reduce the river's recreational appeal.

The lower Clark Fork, from the Flathead River to the Idaho border, contains water of excellent chemical quality. A series of hydroelectric dams which have altered natural streamflows and fisheries. The planned development of a large metals mine in the lower river basin has also caused considerable debate because many tributaries in this reach lack natural buffering capacity and have aquatic communities particularly susceptible to metal toxicity problems.

In Idaho, the rate of nutrient loading from the Clark Fork to Pend Oreille Lake has been a significant concern because it may cause, or at least contribute to, accelerated eutrophication or enrichment and the attendant problems of algae blooms and clouded water. Maintaining or reducing nutrient inputs from sources within Montana's portion of the Clark Fork Basin is important to Idahoans working to control nutrient inputs from shoreline areas of Pend Oreille Lake and other tributary drainages.

In sharp contrast to the mainstem Clark Fork River, many tributaries in the 22,000 square mile watershed area sustain excellent water quality. Several, especially in the Blackfoot, Bitterroot, and Flathead watersheds, originate within protected wilderness areas or national parks and have essentially pristine quality. Other less-protected tributaries have had a history of good resource stewardship and continue to exhibit excellent water quality, blue ribbon-class fisheries, and full support of designated water uses. The majority of tributary watersheds have fair to good water quality and suffer from varying amounts of nonpoint source, or diffuse, pollution resulting from a variety of land use practices.

Silver Bow Creek, one of two headwater tributaries of the Clark Fork, has perhaps the poorest water quality of any tributary or mainstem segment in the entire Clark Fork drainage. Its quality more closely resembles an industrial or municipal wastewater than a Montana headwaters stream. Silver Bow Creek was reclassified several years ago to an "I" Class stream in the Montana Water Quality Standards, which reflects the state's goal to improve the water quality to support the following uses: drinking, culinary and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

Silver Bow Creek currently cannot support most of these uses as a result of heavy metals pollution from former mining and mineral processing operations and inadequate dilution of the Butte municipal sewage discharge.

The upper Clark Fork has variable water quality classifications to reflect variable water quality conditions and problems. From its point of origin below Warm Springs Creek to Cottonwood Creek at Deer Lodge, the river is classified "C-2", which means that it is to be maintained as suitable for: bathing, swimming, and recreation; growth and marginal propagation of salmonid fishes and associated aquatic life, waterfowl, and furbearers; and agricultural and industrial water supply.

From Cottonwood Creek to the Little Blackfoot River, the Clark Fork is classified "C-1", which is similar to "C-2" but with "marginal" removed from the statement pertaining to the propagation of salmonid fishes and associated aquatic life. From the Little Blackfoot River to Milltown Dam, the classification of the Clark Fork improves to "B-1", which specifies that "C-1" uses shall be protected plus drinking, culinary and food processing uses after conventional treatment.

The water quality standards reflect generally improving water quality conditions in the upper Clark Fork with increasing distance from its headwaters region. However, the intended beneficial water uses are not always supported due to a variety of problems.

The metals sources in the headwaters region and metals deposits in floodplains of the upper Clark Fork cause seasonal exceedences of criteria designed to protect aquatic life. Periodic fish kills have been documented above Deer Lodge. Nutrient additions from municipal sewage discharges, agricultural nonpoint sources, and natural sources promote the development of excessive quantities of filamentous algae.

Dewatering of the river for irrigation is an ongoing problem and summer water temperatures periodically exceed applicable water quality standards designed to protect trout. The groundwater adjacent to Milltown Reservoir has been contaminated with arsenic as a result of river-borne tailings material that has concentrated behind the dam.

Nonpoint source pollution resulting from an economic base centered around agriculture, timber harvesting and mining is a major problem throughout the upper basin, both in the tributaries and along the mainstem. Other water quality problems in the upper Clark Fork Basin are more localized in nature and include discharges of toxic substances from municipal wastewater treatment facilities (ammonia) and an abandoned post and pole operation, stream channelization and other habitat alterations.

Throughout the Clark Fork Basin, there is a high degree of public concern for water quality and quantity issues and a strong desire to preserve and enhance the watershed's resource potential. There is also a broad-based interest in continuing the trend of markedly improved water quality and water use support in the Clark Fork and its tributaries resulting from the last two decades of pollution abatement activities.

E. EXISTING WATER USES

This section discusses the basin's existing water uses identified in the Steering Committee deliberations. The order of the listing is alphabetical; it is not intended to imply that any use is more valuable or higher priority than any other. It does indicate the wide spectrum of resource values the Steering Committee is attempting to balance in planning for the management of the basin water resources. This section also does not attempt to quantify the amount or quality of water necessary for these uses in the upper Clark Fork. It merely describes those uses and underscores their significance.

1. Aesthetics

The Upper Clark Fork Basin has spectacular landscapes which are enhanced by the presence, quantity, and quality of its water resources. The North Fork and Landers Fork of the Blackfoot and Boulder Creek are examples of streams in the basin who's headwaters are virtually untrammeled wild landscapes and watercourses. Native natural processes dominate these aquatic systems. The Clearwater River with its chain of lakes, Rock Creek, Georgetown Lake, and portions of the lower and upper Big Blackfoot River are examples of areas with high aesthetic values that are major attributes to the recreation and tourism industry. The Deer Lodge Valley, Nevada Creek Valley, Threemile Valley, Flint Creek valley, and Klienschmidt Flat areas are representative of settled agricultural areas where water has been used to manipulate natural landscapes and vegetation but landscape values remain high.

Use of water resources in other cultural and economic activities have impacted the aesthetic values of the landscape in less desirable ways. Basin stream corridors provided ideal topography for transportation and utility corridors, uses that have had adverse visual and physical impacts on the watershed. Portions of these valleys are geologically confined and the impacts of transportation and utility routes dominate the landscape. The Clark Fork River from Milltown to Garrison is perhaps the most striking example. Silvacultural, hydroelectric generation, and mining activities also have had varying physical and visual impacts throughout the basin, some of which have significantly modified the visual and physical landscape. The largest and most noticeable are those associated with the Anaconda/ARCO operations in the Butte and Anaconda areas.

Communities of the basin have altered the landscape and natural water resources but continue to rely on both as a key ingredient of the their quality of life. Missoula's River Front Park is an excellent example of how basin communities have recognized the value of water resources. The Clark Fork River runs through town and its banks were once used as a dump, industrial storage yard and transportation corridor. The City has, however, cleaned up and re– vegetated the river front, and it is now an aesthetically pleasing site for recreation.

2. Agriculture

Agriculture dominates land use and economic activity in much of the basin. Most of the crop production is used as livestock feed. Irrigation increases and stabilizes this production which in turn stabilizes the livestock carrying capacity of most operations.

The flood plains and terraces of the Clark Fork and its tributaries support dry land pasture, irrigated pasture and crops. The major crops grown are grass hay, alfalfa, and small grains such as barley and spring wheat. Both flood irrigation and sprinklers are used extensively.

Very little land is irrigated by direct pumping from the Clark Fork River. Most irrigation occurs on terraces or benches using water from tributaries that have been diverted at higher elevations. In the Big Blackfoot, Little Blackfoot, Flint Creek, and Rock Creek watersheds, little water is pumped directly from the mainstem. Ditch irrigation diversions are much more common and tributary stream ditches continue to play a dominant role in water supply.

The productivity of agricultural land varies greatly. Rangeland along the valley bottoms and terraces produce a maximum of 0.25 animal unit month (AUM) per acre. Alfalfa hay on moist floodplain soils yields

an average of 2.0 tons per acre and provides approximately 1.0 AUM per acre of grazing. Alfalfa under full service irrigation yields an additional 1.0 AUM per acre and an average of about 2.5 tons per acre. Irrigated small grain crops such as barley yield 60–80 bushels per acre.

3. Domestic

Water law does not define domestic water use. Administratively, DNRC generally assumes it to include in–house domestic needs – drinking water, culinary, cleaning – and up to 1/4 acre of lawn and garden irrigation. Claims filed in the state's general stream adjudication have included as domestic use up to 5 acres of lawn, garden and shelter belt irrigation. The legislature's 1991 temporary closure of the upper Clark Fork River Basin defined domestic use as the use of water common to family homes, including use for culinary purposes, washing, drinking water for humans and domestic pets, and irrigation of lawn or garden of less than 1 acre not to exceed a total volume of 3.5 acre feet per year.

Small wells (8" diameter wells supplied by 0.5 to 0.75 hp pumps) are the most common individual domestic water supply systems in the basin outside of cities with municipal water systems. Some developments of springs for domestic use have occurred at scattered, low density recreational cabin sites. Surface water is a significant source for in–house domestic water supply only in one area of the basin. Because of limited ground water availability in portions of the Clearwater River drainage, recreational cabin and summer home sites, especially along the lake shores, rely upon surface water supplies for in–house domestic use and lawn and garden irrigation.

Ground water supplies, typically wells and springs, developed to provide less than 35 gallons per minute and less than 10 acre feet per year are exempt from the states water right permitting process. However, a water right is still needed. A statutory exemption process allows the ground water appropriator to develop, put to use, and then file an application – notice of completion – for their water right.

The Steering Committee and watershed committees generally agreed that growth in the demand for domestic water supply, especially in rural areas, would continue. Substantial increases in water use could occur if the demand for rural subdivisions and private recreation sites continue to grow. It was also generally agreed that surface waters would not and should not be the source of future domestic water supplies.

4. Fisheries

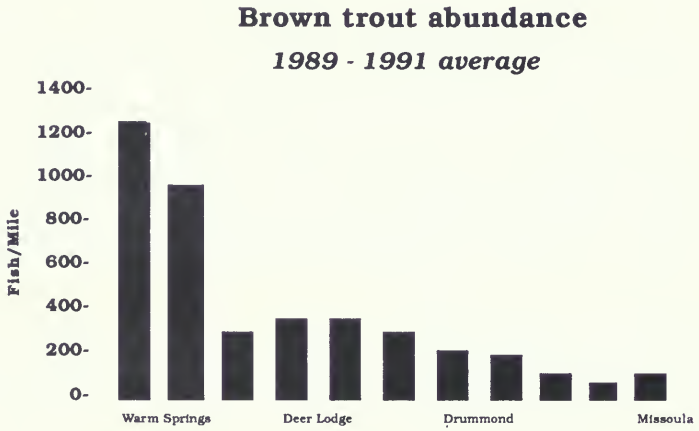
"The Clark Fork River ecosystem is not just that water that maps call the Clark Fork River. This ribbon of surface water interacts with ground water, with the local climate, with the landscape through which it passes, and with the tributaries that feed it. These interactions acting over time determine the river's nature or overall condition ."[1]

The river is, in effect, the valley's "bottom line" where the cumulative effects of all land and water uses are reflected in the river's water quantity, quality, and its habitat, and the life it supports. Fish populations are important components of the Clark Fork ecosystem which, through their diversity and vitality, indicate how well the interactions between climate, land, and water are being managed.

The upper Clark Fork River mainstem is primarily a brown trout fishery with occasional rainbow, westslope cutthroat, brook, and bull trout and mountain whitefish. All species except brown trout and mountain whitefish occur in numbers too low to estimate by conventional estimating techniques. Brown trout numbers are relatively high below the Warm Springs settling ponds where toxic water from the Butte mining area is treated to reduce metals concentrations. However, trout numbers fall off rapidly a few miles below the ponds to a level which remains relatively stable downstream to the Bearmouth area, where they decline to the lowest numbers in the river. Below the mouth of Rock Creek, brown trout numbers rebound and rainbow trout become an important component of the fishery **(Figure 1)**.

Tributaries to the upper Clark Fork are the breeding grounds for trout and other species which inhabit the main river. Brown trout move into the tributaries in the fall to lay their eggs in shallow depressions, called redds, dug by the females in the streambed gravel. The eggs remain in the gravel until

spring, when they hatch. The young remain in the tributaries for varying lengths of time up to two years before they move to the main river to mature and repeat the cycle. Other species, such as whitefish and suckers may also use the tributaries for spawning. Successful completion of fish life cycles requires a reasonable quantity of clean water, clean streambed gravel, good hiding cover such as log debris jams, undercut banks, and overhanging vegetation. Thus, considerations of the river as a whole must include the tributaries as vital components.



Nearly all of the tributaries also have resident fish populations. The mountainous headwaters of most of the tributaries, such as Warm Springs, Lost, Dempsey, and Racetrack creeks, support vital reserves of native westslope cutthroat and bull trout, both of which are species of special concern in Montana because of declining numbers and available habitat. Non- native species, such as brook, rainbow and brown trout, enter the populations as one progresses out of the mountainous reaches downstream to the foothill and valley bottoms.

The mainstem Clark Fork has the potential to be a **"blue-ribbon"** trout river. The usual measures of stream productivity (alkalinity, hardness, total dissolved solids) indicate that it should be as productive as Montana's finest trout waters such as the Big Hole, Ruby, and Blackfoot rivers, and Rock Creek. However, comparable habitats in these other rivers produce 2 to 3 times more trout than the Clark Fork River primarily because of the presence of toxic metals in the Clark Fork.

5. Industrial and Mining

Mining and mineral processing created the initial and largest growth in the basin and stimulated the area economy. Gold and silver exploration drew a large number of prospectors to the area in the 1800's, and every watershed in the basin had some level of exploration or development. The largest and most significant long term mining and processing operations in the basin were the copper mines and processing facilities in the Butte and Anaconda area. The growth of mining created demand for agricultural production, wood products, transportation, and hydroelectric power.

Mining and industrial operations have lessened in the basin with the closure of ARCO (Anaconda) operations in the late 1970's. Montana Resources Inc. continues to operate a portion of the Butte operations. A number of small scale privately owned operations, predominately placer gold operations, remain active and scattered throughout the basin. Beal Mountain mines gold via a heap leach processing operation south of Greyson Hot Springs (Fairmont) in the Upper Deer Lodge Valley. Seven-up Pete Joint Venture is conducting reconnaissance and planning for a potentially large hardrock gold mining operation just east northeast of the mouth of Landers Fork, a tributary to the Big Blackfoot. Permitting activities for this mine will begin this summer.

Early mining and mineral processing made great demands on water, and as was true throughout the western states, Montana's water laws were developed by the miners. In the 1800's, water was used to provide mechanical power as well as directly in the mining, milling, refining and smelting processes. Later, rivers and streams were harnessed to generate electricity also used in mining and related processes. Water demands have changed in all industries. Public demand and statutes require better waste management and treatment. Industrial processes have become more efficient and less consumptive. These features have lessened industry's, including mining's, demand on water.

One example of this change is placer gold operations. Historically, a placer operation was a run-of-the-stream operation in which large quantities of water were continuously diverted through the processing equipment such as sluice boxes. Today, a small miner will pump a small quantity of water from a stream to a holding pond. Water is then moved through the processing plant, discharged to a settling pond and then recirculated through the system.

6. Municipal

Municipalities in the basin rely on both ground and surface water for public water supplies. Butte relies on surface water, a portion of which is diverted from the Big Hole watershed outside of the Clark Fork Basin. In response to the age and deteriorating conditions of its existing system, Butte is upgrading and rebuilding its Big Hole water supply system. Historically, Anaconda utilized water from the Georgetown\Silver Lake System. Anaconda has begun construction and expansion of it's water supply system that relies entirely on groundwater wells above the town along Warm springs Creek. Deer Lodge also utilizes groundwater wells for its supply, although it formally diverted water from Cottonwood Creek. Philipsburg imports water from Fred Burr Lake and Creek. Missoula uses a series of ground water wells for its municipal supplies. Groundwater studies indicate a strong relationship between Missoula's ground water and Clark Fork river discharge. Seeley Lake utilizes an infiltration gallery which pulls water from the lake. Residents of many small towns including Lincoln, Ovando, Potomac, Hall, Maxville, Clinton, and Piltzville rely on individual or small multi-family wells.

7. Power Generation

The Montana Power Company (MPC) owns two hydroelectric dams and generating plants in the Upper Clark Fork, Flint Creek dam near Georgetown Lake and Milltown dam near Missoula. There are two additional dams and power generating plants on the Montana reach of the Clark Fork, Thompson Falls owned by MPC, and Noxon Rapids owned and operated by the Washington Water Power Company (WWP). All of these hydroelectric facilities use water for storage and power generation.

The Flint Creek dam began as a small earth dam built in 1885 to provide power for the Bi-Metallic Mining Co. at Philipsburg and Granite. The dam was purchased by the Anaconda Copper Mining Co. in 1901. In 1919, the Anaconda Co. raised the dam to its current level, and in 1925 the entire project was transferred to MPC. MPC generated power at Flint Creek until November 1989 when the woodstave flowline to the power house ruptured. MPC is currently in the process of transferring the Flint Creek project and its FERC (Federal Energy Regulatory Commission) license to Granite County. The adjudication of the water rights for the Flint Creek project are presently stayed by the Montana Water Court.

The Milltown dam was developed by Butte copper king W.A. Clark to power the sawmill at Bonner. Milltown's electricity also ran electric lights in Missoula and an electric railway service running between Missoula and Bonner. The water rights at Milltown have a 1904 priority date. Milltown dam is a small facility. It generates 3.4 megawatts, using 2,000 cubic feet per second (cfs) and up to 1,451,556 acre-feet of water a year (af/yr) to generate power, and 940 cfs for storage. At times, more than half the water flowing through the dam is from the Blackfoot River. MPC's water rights at Milltown will therefore be adjudicated in three basins: two Clark Fork River sub-basins (76G and 76M) and the Blackfoot (76F).

Thompson Falls dam was completed in 1917. It was developed to provide power for sawmills at Thompson Falls, the mines in the Coeur d'Alene region and the Chicago, Milwaukee and St. Paul Railroad. Based on notices of appropriations, the priority dates for MPC's water rights at Thompson Falls range from 1905 to 1909. Thompson Falls' historic total generating capacity is 40 megawatts. It uses 11,120 cfs and

up to 8,050,508 af/yr for generating power, as well as 7,547 cfs for storage. MPC's water rights for Thompson Falls were decreed as part of Basin 76N. The company is currently expanding the facility to generate another 50 megawatts.

Completed in 1960, Noxon Rapids dam is owned by Washington Water Power, a utility company smaller than MPC. Noxon Rapids has a nameplate generating capacity of 466.2 megawatts, and serves ratepayers in northern Idaho and eastern Washington. WWP's water rights at Noxon Rapids total 55,400 cfs. Of this, 40,400 cfs are decreed rights – 35,000 have a priority date of Feb. 20, 1951 and 5,400 have a priority date of April 3, 1959. The decreed rights include 29,248,264 af/yr for power generation; 267,000 af/yr to maintain minimum reservoir elevation; 230,700 af/yr used once a year for stream flow regulation; and 38,400 af/yr usable at any time to meet electric-system load requirements and regulate stream flows. An additional 15,000 cfs were granted in a provisional water use permit issued by the State of Montana in 1976.

All the tributaries of the Clark Fork contribute water for beneficial use and reuse at the downstream dams. Because they are hydroelectrically connected, the large hydroelectric water rights on the Clark Fork River affect the availability of water in the river's upper reaches. Because the hydroelectric water rights are large, many existing and all new water allocation activities in the Clark Fork River Basin potentially affect the ability of the power companies to exercise their water rights. The Clark Fork doesn't have enough water to fill these hydroelectric water rights year-round. Milltown, the smallest of the dams, generally has only enough water to satisfy its rights April through June. According to a 1988 Montana Department of Natural Resources and Conservation study, Noxon Rapids dam's water rights are satisfied an average of only 22 consecutive days a year, generally late May to early June. A 1988 Montana State University study concluded that additional diversions above Noxon cause a direct reduction in power generation at the dam.

8. Recreation

The basin includes large blocks of public and private land supporting a wide range of recreational sites and activities such as fishing, hunting, camping, boating, white water rafting, mountain biking, snowmobiling, wildlife observation, and site-seeing. The public lands include designated wilderness and roadless areas and historic sites. Recreation is a major contributor to the basin's economy, and most recreational activities rely on water resources to enhance the recreation experience.

Recreation on the Big Blackfoot mainstem is rooted in fishing, but over the last twenty years floating and rafting along the lower corridor has increased significantly. The lakes of the Clearwater River drainage draw residents from across the state and elsewhere for water based recreation.

Fishing is the dominate water based recreation activity on lakes, rivers and streams through-out the basin. Two of the basins watercourses, the Big Blackfoot River and Rock Creek have been singled out and included within Montana's "blue ribbon" fisheries. As has been mentioned elsewhere, DFWP was granted in-stream flow rights, known as Murphy Rights, to protect the Blackfoot and Rock Creek fisheries.

The Blackfoot River is also heavily used by floaters. DFWP has created a special recreation corridor on the river which it manages in accordance with rules developed through agreement with local land owners. The agreement allows the land owners to exercise control over recreation issues such as the location of parking areas and camp and access sites. Land owners, in return, allow recreationists greater access to private lands than would otherwise be the case.

9. Storage

The construction of water storage projects is one water management tool historically used throughout the basin to "save" water. A primary source of water for the Upper Clark Fork Basin is winter snowfall. This snow melts during the spring and early summer and the resulting runoff discharges though the basin. Some of it infiltrates the soil profile, stream banks and beds and recharges ground water aquifers. Most of the water, however, leaves the basin during the spring flushing flows. Storage holds high spring flows for use later in the year.

Water can be stored two ways – behind dams and in the ground. While they provide other benefits such as flood control and recreation, these dams were constructed primarily to support irrigation. A second method for storing spring runoff involves the creation and use of irrigation return flows. Irrigation water applied in excess of plant needs is stored in the alluvial fill water table and with some delay travels back to the stream. Actual amounts stored and the timing of return flows depend on local conditions including the amount of water applied, amount used by crops, and soil conditions.

10. Superfund

Activities of the Superfund Program will play a major role in the future of the Upper Clark Fork Basin. The Superfund program was created in 1980 by Congress to identify, investigate, and cleanup hazardous substances, pollutants, and contaminants that have been or may be released into the environment. EPA initiated Superfund activities in the Upper Clark Fork Basin in 1982 to address problems resulting from over 100 years of mining and processing operations, and related wood treating operations.

Problems at the four designated Superfund sites in the Upper Clark Fork Basin have been prioritized by EPA with input from the State of Montana, ARCO (the major responsible party), and others. Since the first master Plan in 1988, a great deal of investigation and cleanup activities have occurred. While the Superfund program initially focused much of its attention on human health –related problems, environmental concerns in the river system have also been addressed.

The following does not attempt to describe the entire range of Superfund activities, which in 1994 involved construction by ARCO on projects valued at more than 100 million dollars, but rather focuses on the activities most related to the river system. Several major Superfund projects – for example, the Berkeley Pit Mine Flooding and the Anaconda Old Works – are not discussed because they do not relate directly to the river system.

The Warm Springs Ponds continue to serve as a vital treatment system that reduces the toxicity of metals in Silver Bow Creek and allows a fishery to exist in the Upper Clark Fork River. Construction of the final components of the remedy to improve treatment and contain metal contaminants will occur near the end of 1994. Completion of this project will eliminate fish kills caused by runoff from tailings, provided cleaner water for downstream users and the aquatic environment, and helped stabilize flows up to the 100 year flood event by capturing and treating all such flows.

It is expected that initial efforts will begin in late 1994 to review existing information and plan detailed investigations on the Clark Fork River itself from Warm Springs Ponds to Milltown Reservoir. An extensive effort is anticipated to obtain input from local interests in planning this work. A cleanup decision may be made in 1996, with actual cleanup work beginning the following construction season. It is known that stream bank –stabilization, especially as affected by cattle grazing, will be one of the key issues to be addressed.

EPA decided in late 1993 to continue investigating the contamination at Milltown Reservoir and evaluating cleanup alternatives. A final decision is expected in 1996 regarding the Milltown Dam area, particularly the contaminated groundwater at the site and issues relating to the stability and permanence of the Milltown Dam.

Another major activity underway affecting the Upper Clark Fork Basin is the removal of contaminated soils and tailings at the Butte Reduction Works/Colorado Tailings in Butte. The second year of an approximate five year cleanup is currently underway, with the wastes being hauled to the Opportunity Ponds near Opportunity. This cleanup will significantly reduce metals that currently flow down Silver Bow Creek into the Warm Springs Ponds.

An ongoing investigation of techniques for cleaning up Silver Bow Creek from Butte to the Warm Springs Ponds is the final major Superfund activity currently underway on the river system. A decision on how to clean up contaminated streambank tailings and bed sediment will be made in 1995 after significant opportunity for public input. Construction will likely begin the following year. The cleanup of Silver Bow

Creek, if successful, may ultimately reduce the need for the Warm Springs Ponds as a treatment system and allow for a natural fishery to be re– established in Mill, Willow, and Silver Bow Creeks.

Water rights implications for each of these projects is examined during the investigation portion of each of the cleanup projects. EPA and the responsible parties consult closely with the DNRC concerning this analysis. For those cleanups being implemented, DNRC determined that the Warm Springs Ponds cleanup required limited water rights for limited purposes. ARCO, as site owner, received water use permits for the wildlife management pond and the Pond 2 tailings cover, and will soon apply for a permit for the inactive area. ARCO is also investigating appropriate means for augmentation or replacement of existing water for the permitted Warm Springs activities, in consultation with DNRC and EPA.

For future projects – Milltown Dam, the Clark Fork River, and the Silver Bow Creek cleanups – water rights analysis will occur in conjunction with remedy selection. Water rights implications will be presented with the analysis of various cleanup alternatives, prior to response or remedy selection. EPA and the State will monitor compliance with State water law as these remedies are implemented.

The state of Montana is pursuing a natural resource damage claim and restoration plan separately. Water rights will be examined for those actions as well, and the State will comply with State water law as it implements these actions.

Because Superfund activities are being addressed in other legal and administrative processes, with one exception, this plan does not make recommendations regarding them. The exception is a limited exemption from the recommended closure of the basin to most new surface and ground water rights. (See section V Closure of the basin to New Water Rights Permits.)

11. Transportation

The Blackfoot River has a colorful history of "river pigs" guiding massive old growth timber down river to the lumber mills. Lakes in the Clearwater River drainage were dammed with low structures to store water and hold logs until they could be floated downstream for processing. The basin's rivers and streams are no longer used to transport commodities. Water craft today are recreational. Kayaks, rafts, canoes, float tubes and, on the lakes, motor boats pull skiers or carry fisherman across the basins moderate sized lakes. Water leaving the state does support the flow of the Columbia River which cheaply transports Montana commodities such as wheat to Pacific ports.

The basin's river and stream corridors were also historically important transportation routes, and they remain so today. The highly dissected mountain ranges forced traffic to travel along the rivers in or through the basin. The Lewis and Clark expedition followed a native American travel way from the mouth of the Blackfoot River upstream to the Landers Fork, then overland to Alice Creek and finally over the continental divide and down Green Creek. The first transcontinental railroad was completed through the basin with the meeting of the east and west ends near Gold Creek on September 8, 1883. It passed through Helena, down the Little Blackfoot and Clark Fork rivers and on to Spokane, Washington. Two railroad beds and a vehicle road followed the river from Missoula to Butte and Helena by 1910. Today the railroad beds remain, although since 1970 only one is active.

The railroads have been joined by an interstate highway, a secondary access road, various spur roads, and utility corridors. A major gasoline pipeline also follows the Clark Fork River. In the 1980's, a fiber optics communication line was buried along the railroad right of way through the basin. A major high voltage electricity transmission line roughly follows the Clark Fork River in its route from coal generating plants in eastern Montana to the west where it joins the west coast transmission network. This line enters the basin north of Deer Lodge, crosses the valley and bisects the mainstem's southern tributaries. The line does not follow the valley floor.

F. EXISTING WATER SYSTEM OF MANAGEMENT IN THE BASIN

1. Overview

Montana's statutes on water quantity management are based upon the "First in Time is First in Right" theory of water law explained in Section III. A. Existing Water Law. This legal doctrine provides for the distribution of the available water resource according to the priorities set by the earliest date of water development and use.

Water management activities in a basin are often a reaction to current water conditions. A shortage of water is the classic stimulant to concern with its use and allocation. Typically, water users focus on their individual farmstead water management operations. Individual management options and the associated water rights tend to be reviewed or modified only when conditions change. Examples of such changed conditions include an influx of new users or nontypical uses, pollution problems, or natural events such as drought and flood. Reacting to change does not always result in mutual management benefits and may result in conflict. Long- term, collective water management by groups of users is not widespread. Management to accomplish specific goals through a wide range of water availability or use conditions for a given stream or watershed is normally associated with operation of a water storage project.

a. Informal Stream Management

The most common but least noticed and least understood form of water management is the informal communication between water users on a given ditch or stream reach. Rural water users tend to be united by a shared emphasis on community and common economic and cultural goals. Because they often know each other and have some understanding of their neighbor's needs, local water users are often able to maintain open and honest communication about water issues and to negotiate resolution of conflict or sharing of the resource.

Since they are typically responses to short-term water availability, informal issue resolution tends to be short-term. However, occasionally these agreements become formalized through memorandums of agreement, contract, or stipulation. Sometimes these documents are recorded and become appurtenances to the land. Water use agreements or management activities which follow the general precepts of the appropriative water law have support in the legal system.

b. Water Commissioners

Water users relying on water from a storage reservoir or from a decreed stream can petition the district court and have a water commissioner appointed. (A decreed stream is one where the water rights have been identified and quantified, including setting the date of first use through a court decision.) The water commissioner is authorized to distribute and "police" the use of available water. Use of a commissioner on most streams is primarily reactive management. Typically, a commissioner distributes water only in times of shortage.

A commissioner will allocate available water based on water right priority dates and limits as set by a decree. A sharing of shortages typically occurs only among those water users having the same priority date. In complex basins where return flows are understood, experienced commissioners may manage deliveries according to priorities modified by an understanding of the sub-basin hydrologic system. Under these circumstances a water commissioner may deliver water to upstream junior users when artificial recharge and return flows assure adequate supplies to a downstream senior user. A commissioner distributing stored water "separates" natural flow from releases of stored water and then delivers the stored water to its owners. Disputes concerning a commissioner's distribution activities are settled by a hearing before the local district court.

2. Upper Clark Fork Basin Water Management Activities

Water management activities on individual streams throughout the basin reflect the users reaction to local development, water availability, and other users management. Hence, the intensity of management

and issues addressed differ. The following is a brief description of water management in each of the basin's six watersheds.

a. Upper Clark Fork Mainstem and Tributaries

This portion of the basin, which includes the mainstem and tributaries above the Little Blackfoot, has a long and colorful history of water right development, management and litigation. Many of the tributaries to the river are decreed. Historic competitive demand for water by mining, agriculture, and later, public water supplies required court adjudication, settlement of management disputes, and distribution of available water supplies. The Montana Water Court's Upper Clark Fork Temporary Preliminary Decree issued in May 1985 under the state's general stream adjudication includes this watershed, but to date this decree has not been utilized for water management.

Water commissioners, administering both decreed and stored water, are very common in this watershed. For example, appointment of a water commissioner is an annual event on streams such as Dempsey, Racetrack, Cottonwood, and Warm Springs creeks as well as others. This more detailed water administration typically does not, however, extend to the river's mainstem. In recent drought years, low water levels in the mainstem have been an issue of broad public interest extending beyond the watershed because of fishery and water quality concerns.

The National Dam Safety Inventory identifies 51 water storage facilities in this watershed. Many of these are dams that augment storage in high mountain lakes. These facilities, which are typically owned and controlled by a single or small group of private owners, increase available water supply on tributary streams during the irrigation season. The Twin Lake Creek, Storm Creek, Storm, Georgetown and Silver Lake complex is the most well known and largest storage system in the watershed. Basin water users have considerable interest in the continued use of this 50,000 acre feet of storage. This system was developed to supply mining and smelting water demands in Butte and Anaconda as well as some municipal and agricultural demands. Portions of the system, including the pumped storage out of Georgetown Lake, have been inactive since the closure of ARCO's Butte Montana operations. If the inactive portions were reutilized, it may be possible to increase the available active water storage significantly.

b. Little Blackfoot River

Land use patterns in the Little Blackfoot watershed have not changed substantially in recent years. Water management also follows traditions established much earlier. Agriculture dominates the present diversionary water use. Historically, mining was a significant water user on a number of the rivers tributaries. This watershed does not have a significant storage project or a water users association.

Most of the streams in the watershed are not historically decreed. The Threemile drainage and Ophir Creek are notable exceptions. The Upper Clark Fork Temporary Preliminary Decree, issued by the Montana Water Court in May 1985 under the comprehensive stream adjudication, includes the Little Blackfoot watershed.

Water users in parts of the drainage, such as Threemile Creek, are improving local water management and administration through diversion structure repair and installation of standardized water measurement devices – parshall flumes. With these infrastructure improvements and conformance to the existing decree, water distribution is becoming more accurate, thereby reducing potential conflict and enhancing local management. In low water years, a water commissioner may still be utilized.

c. Upper Clark Fork River – below the Little Blackfoot

Excluding Rock Creek and Flint Creek tributaries, this portion of the basin is dominated by smaller, disconnected, irrigated fields scattered along the valley bottom. Historically water conflicts existed on tributary streams such as Donovan, Dirty Ike, Cramer Sixty Springs, and Gold creeks, and Rock Creek near Garrison. Such conflicts were typically limited to a few, often one or two, individuals. The only historic decrees in this watershed were developed to settle these disputes. In recent years, water commissioners have rarely been appointed.

The Montana Water Court's Upper Clark Fork Temporary Preliminary Decree, issued in May 1985 under the comprehensive general stream adjudication, includes this watershed. To date, this decree has not been utilized for water management or allocation.

The lower reaches of the Upper Clark Fork River Basin include only one major storage project, Montana Power Company's (MPC) Milltown dam. MPC has a significant early water right (December 11, 1904) associated with it's hydropower generation at this dam. This right for 2,000 cfs peak demand may have significant effects on water management above it. To date MPC has not made a call for water to protect its right during periods of low flow. There are also some small high mountain lakes on tributaries in this watershed which have been enhanced for storage. Rock Creek Lake is a privately owned, active storage facility, which is used to export water into the Deer Lodge Valley. Gold Creek Lake has been utilized for storage, but is presently inactive.

d. Flint Creek Watershed

Flint Creek is a complex basin. This drainage's natural confinement by the canyon between the mouth of Boulder and Marshall Creeks separates the watershed into an upper and lower basin. This natural divide also resulted in the historic development of somewhat isolated upper and lower basin water management activities and decrees. An upper basin decree was developed in conjunction with the Georgetown Lake hydropower plant. A lower basin decree proved to be needed early in the lower basin's history to settle water right priorities in that area. A Temporary Preliminary Decree, under the state's comprehensive general stream adjudication, was issued for Flint Creek by the Montana Water Court in March 1984.

The Flint Creek watershed includes four storage reservoirs. Water from Rock Creek's East Fork Reservoir is transported into the drainage over the Trout Creek divide and is carried virtually the entire length of the watershed. The discharge from Georgetown Lake is required by the decree to emulate the natural stream flow through the irrigation season. Fred Burr reservoir provides water to upper basin users, including the town of Philipsburg. In the lower portion of the watershed the relatively new Willow Creek reservoir provides water in the Willow Creek drainage. East Fork and Willow Creek waters are the most widely used and intensely managed in the watershed. Water commissioners are needed to separate stored water from "natural" flows and deliver it from these projects every year. Water commissioners are also appointed to distribute historically "decreed" water in water short years.

Flint Creek watershed residents have become much more active in water management. A county watershed committee was created to address water management and policy in 1984 after the issuance of the Temporary Preliminary Decree. Presently, three county or watershed committees are examining water issues, including the Flint Creek watershed committee advising the Steering Committee, the Granite County Water Resources Basin Committee, and a water subcommittee active in the development of the county comprehensive plan. Both the watershed and Water Resources committee's are supporting a basin wide cooperative return flow study.

The return flow study is a water quantity focused data collection and modeling effort designed to increase understanding of how water flows through the watershed. Local water users, individually and through group representation, in cooperation with the DNRC, DFWP, United States Bureau of Reclamation, United States Soil Conservation Service, and Granite Conservation District have initiated a five year basin-wide study of water supplies under the existing water use regime. With this baseline data, local water users will be able to develop and implement a local water management system. The data collected will provide all parties with the ability to assess and adapt to the inevitable annual variations in precipitation and changes in land use. It may also assist local users to determine where limited resources should be focused when evaluating water development and infrastructure improvements.

e. Rock Creek Watershed

Streams in the Rock Creek watershed are generally not subject to intense water management. Local water users share and deliver water under local agreements or informal enforcement of priorities. The most formalized water management activities in the watershed are linked to the storage and delivery of water out of the East Fork Reservoir located on the East Fork of Rock Creek. Most of this water, however,

is exported out of the watershed and into Flint Creek. The Flint Creek Water Users Association, the contract manager of the state-owned East Fork Reservoir, is responsible for the passage of natural flows through the reservoir during the irrigation season. Passage of natural flows assures Rock Creek and East Fork of Rock Creek water users delivery of their water rights, especially those who are senior to the reservoir. Presently, seepage losses and return flow between the dam and the siphon intake are the primary method of "by passing" this natural flow. At times this method of delivery has provoked question and controversy.

Some of Rock Creek's tributaries were historically decreed. In March 1984 a Temporary Preliminary Decree was issued for the entire watershed under the general stream adjudication.

The DFWP has in-stream flow water rights, known as "Murphy Rights", in Rock Creek. These rights confer on DFWP the option of calling on water users with rights having a priority date later than its Murphy rights, i.e. July 6 and 7, 1971, to curtail their use during drought periods. However, in recent low flow years DFWP has not exercised this option. DFWP has also not attempted to examine the water use by senior right holders to ensure that they are operating within the limits of their right. In other basins to date, DFWP has limited calls for water to only mainstem junior water users. In Rock Creek only one mainstem user has a right junior DFWP's Murphy right, but several Rock Creek tributaries in the lower watershed have additional junior uses. DFWP could, therefore, stimulate a comprehensive watershed-wide management scheme to protect its Murphy rights by: 1) including tributaries with the mainstem in their area for calls on junior users; 2) examining water use by senior water right holders; and 3) by calling for appointment of a commissioner under the Temporary Preliminary Decree.

f. Big Blackfoot

The Big Blackfoot River is the largest and perhaps the most diverse of the watersheds. Very few of the water rights in the drainage have been the subject of an historic decree. The Montana Water Court has not conducted any adjudicatory actions in this basin and is not expected to do so within the next 5 years. Those stream which do have historic decree's, (Union Creek, Elk Creek, Cottonwood Creek, North Fork Blackfoot, Warren Creek, Keep Cool Creek, Lincoln Creek) have rarely utilized a water commissioner in recent years.

In the majority of the watershed's agricultural areas, landownership has retained a link to past operators and the "tradition" and pattern of historic water use has remained stable. This not the case in areas where land ownership is changing. Some ranches have shifted to absentee ownership, and the new owners are often unfamiliar with historic patterns of use and water law. In portions of the watershed agricultural tracts have been broken into small rural homesites, ranchettes, or recreational property that do not support historic water use patterns. These changes are resulting in increased water-related conflicts.

In the Clearwater River drainage, recreation rather than agriculture dominates water use. The Clearwater does include small farmsteads, and the most significant agricultural operations are located near the river's mouth. Lake and stream side cabins, resorts and recreational businesses occupy the accessible valley bottom. Sources of water for new recreational homesites and resorts are either small ground water wells or surface water. Surface water is being used because adequate ground water is often not available.

The Nevada Creek drainage is unique in this watershed because of its active, ongoing water management activities. The state-owned Nevada Creek Reservoir, constructed in 1938-40, is operated by the Nevada Creek Water Users Association. Water deliveries in this drainage are regulated annually by a commissioner pursuant to several historic water decrees. The Water Users Association, DNRC, DHES, DFWP, Soil Conservation Service, Bureau of Land Management, and United States Geological Service are cooperatively studying reservoir operations and the drainage water quality and fishery.

As is the case with Rock Creek, DFWP has Murphy in-stream flow rights on the mainstem of the Big Blackfoot River. These rights have a priority date of January 6, 1971 and cover the reach from the River's mouth upstream to the confluence of the North Fork . DFWP has made a call on mainstem junior users to protect these rights three times. New water rights continue to be developed on the river's tributaries, especially in the Clearwater drainage. No clear management method has yet been developed to enforce priorities in water deliveries between new uses on the tributaries and existing mainstem demands.

IV. CONSIDERING AND BALANCING ALL BENEFICIAL USES

The first directive of the Montana Legislature to the Upper Clark Fork River Basin Steering Committee in writing the basin's water management plan is to "...consider and balance all beneficial uses of the water in the Upper Clark River basin." The Legislature did not, however, specify what "consider and balance" means. The Steering Committee has therefore developed the following five part response to this direction. First, in Section III E and Table 4 below, it has identified the uses of water in the basin that must be considered and balanced. Second, in Section VI, it will identify critical needs or problems for some of the above uses together with the possibilities for meeting the needs and fixing the problems where possible. Third, in Section VI, A it will recommend creation of an ongoing basin water management mechanism including a basin-wide committee and watershed committees. Fourth, in Section V, it will recommend closing the basin to the issuance of most new water rights which will have the effect of setting aside any unappropriated water for possible future uses. And fifth, in Section VI H, it will recommend testing a new mechanism for protecting of in-stream flows.

The uses of water in the upper Clark Fork River Basin considered in this plan are shown in **Table 4**. The order of the list does not suggest any priority, nor does it imply that some are more legitimate and valuable than others. Each of these four remaining components of "considering and balancing" will be considered in later sections.

Table 4. Upper Clark Fork River Basin Water Uses

Aesthetics
Agriculture
Domestic
Fishery
Industrial/mining
Municipal
Power Generation
Recreation
Storage
Superfund remedial actions
Transportation

V. CLOSURE OF THE BASIN TO NEW WATER RIGHTS PERMITS

A. RECOMMENDATION

The Upper Clark Fork River Basin Steering Committee recommends that the legislature act to close the Upper Clark Fork River Basin to the issuance of most new surface and ground water use permits. The area closed would include the entire Clark Fork and Blackfoot River drainages above Milltown Dam. The closure is not intended to affect existing water management practices. It would be conditioned so that it would not preempt new permits for the development of:

1) Storage for beneficial uses;
2) Stock water;
3) Uses determined to be non-consumptive; and
4) Superfund remedies, except for dilution, required by the U.S. Environmental Protection Agency for Superfund sites designated as of January 1, 1994.

The exemption for Superfund remedies, the fourth exemption above, will expire after five years on January 1, 2000, so that applications for new water rights permits for this purpose would have to have been filed on or before December 31, 1999.

A "non-consumptive use" means a beneficial use of water that does not cause a reduction in the source of supply because substantially all of the water returns without delay to the source of supply, causing little or no disruption in stream conditions.

Concerning ground water use, existing law does not require a permit for a well producing water at less than 35 gallons per minute not to exceed a total volume of 10 acre-feet per year. This proposal would not change this situation so that wells under this production limit could continue to be drilled for any purpose.

It should also be noted that including ground water in the closure as proposed would not allow city and towns to obtain a permit for new wells for drinking water or other municipal uses. Municipalities will still be able to purchase or condemn existing water rights to expand domestic water supplies.

B. DISCUSSION

1. Advantages

The preceding proposal to close the basin to most new water rights would increase protection of existing water rights by eliminating the need to object to applications for new permits, by reducing the need to enforce existing water rights against new permits, and by reducing the cost of protecting existing water rights. A closure would also prevent additional diversion of water from the basins streams and rivers and thereby protect the existing fishery, aquatic life, and water quality.

2. Disadvantages

This proposal would restrict the availability of new water use permits, and hence the development of additional water throughout the basin.

3. Proposal Rationale

This proposal responds to the preponderance of public comments made to date to the Steering Committee in writing, at the basin-wide closure meeting, and in each of the watershed committees about

several issues. In particular the public comment generally:

- Supports a closure for the basin to achieve one or more of the above advantages;
- Opposes domestic use of surface water;
- Opposes the DNRC interpretation of basing a decision about the separation of ground and surface water on the "cone of depression" argument;
- Opposes leaving ground water out of the closure because it is linked hydrologically to surface water throughout much of the basin;
- Does not oppose the stock water exemption;
- Supports generally the storage exemption, particularly when the storage would benefit the fishery as well as other uses;
- Supports reviewing both the closure and the exemptions after a fixed period, but no clear consensus exists about the length of the period; and
- Is not comfortable with a "blank check" Superfund exemption.

Concerning ground water use, existing law does not require a permit for a well producing water at less than 35 gallons per minute not to exceed a total volume of 10 acre-feet per year. This proposal would not change this situation so that wells under this production limit could continue to be drilled for any purpose.

C. HIGHLIGHTED ISSUES

Two issues, inclusion of ground water in the closure and exempting Superfund activities from the closure, are highlighted so that the public can comment on them.

1. Ground Water Inclusion

Because of concerns expressed by water users in several watershed committee meetings, the Committee decided to include ground water permits in the closure proposal in the draft plan. That is, new ground water right permits could not be processed if the closure proposal is adopted. However, the Steering Committee may be willing to exempt new permits for ground water use that would not adversely affect existing surface or ground water rights, if a satisfactory means can be found to do so.

The following language in the statute creating the Committee (MCA 85-2-337) attempted to achieve this purpose:

> **(2)...the Department shall find, based on substantial credible evidence, that the source of the ground water is not a part of or substantially or directly connected to surface water.**

The DNRC has interpreted this language to mean that unless the "cone of depression" of a new ground water well would intercept surface water, i.e. result in an immediate, observable loss of surface water, a new ground water permit would be issued. Several water users in watershed committee meetings opposed this interpretation because it may result in long-term unacceptable adverse effects on existing surface and ground water users.

It should also be noted that including ground water in the closure as proposed would not allow city and towns to obtain a permit for new wells for drinking water or other municipal uses.

2. Superfund Exemption

S.B. 434 provides an exemption from the existing temporary basin closure for:

> **(b) an application for a permit to appropriate water to conduct response actions or remedial actions pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1990...A permit issued to conduct response actions or remedial actions must be limited to a term not to exceed the necessary time to complete the response or remedial action, and the permit ma not be transferred to any person for any purpose other than the designated response or remedial action.**

EPA and ARCO support including a similar exemption in any continuing basin closure. They are willing to accept a five year sunset date for such an exemption because both believe the response or remedial actions related to the Upper Clark Fork River will be identified within that time. Some Steering Committee members are opposed to continuing this exemption because any response or remedial action should not be supported by a junior water right with a 1995 or later priority date. These members believe that instead of a new permit, ARCO should purchase a senior water right. ARCO counters that a junior water right for Superfund activities would allow existing senior water right holders to maintain their present water uses in wet years. If, on the other hand, ARCO must purchase a senior water right, then the former non–Superfund related water use would be lost.

The Committee decided to include in the draft management plan a limited exemption that would allow new permits for water rights necessary to support Superfund remedies. The limitations are:

1) The remedy must be required by EPA for a federal Superfund site in existence as of January 1, 1994; thus permits cannot be obtained for new federal Superfund sites.
2) New permits cannot be obtained if the remedy is dilution, i.e. if the water would be used to dilute pollution.
3) This exemption expires after five years, i.e. on the last day of 1999. This means that the ability to obtain a permit for a new water right to support Superfund remedies ends on December 31, 1999. Permits obtained during the previous five years would not be affected by the end of the exemption.

This exemption only allows the opportunity to apply for a new water right to support Superfund activities. It does not guarantee that the water right would be granted. As is the case with any new water right, an applicant under this exemption would have to show that the new right would not adversely affect any existing water right. Existing right holders would have the chance to object to the new permit if their rights would be harmed.

VI. WATER ISSUES AND RECOMMENDATIONS

With the ideas and suggestions the basin's public provided in writing or at Steering Committee or watershed committee meetings, the Steering Committee identified and developed recommendations regarding the following water issues.

A. CONTINUING UPPER CLARK FORK WATER PLANNING

ISSUE

Any action taken by the legislature or any executive b[illegible] to this plan should be predicated on preserving existing water rights.

C. WATER ADJUDICATION SYSTEM

Issue

In order for water rights to be comprehensively admin[illegible] in the [illegible] Clark Fork Basin, there have to be final decrees. Temporary preliminary decrees [TPD[illegible] have been [illegible] for all but the Blackfoot subbasin. In order for the TPDs to become final, the reserv[illegible] water right[illegible] federal land management agencies and tribal governments have to be considered.

Reserved water rights are the province of the Montana [illegible]rved Water [illegible]s Compact Commission. The Compact Commission has a very large plate in front of it[illegible] and limited [illegible]urces. The reserved water rights of the U.S. Forest Service are a significant portion of the workload [illegible] how those rights are dealt with will affect a very large number of sub-basins across the state. Until the Forest Service's reserved water rights are addressed, it will be impossible to complet[illegible] decrees [illegible] at least half of the state, including the entire Clark Fork Basin. There are a signific[illegible] number of [illegible] basins for which Forest Service reserved rights are the only reserved water rights involved.

Recommendation

The Steering Committee recommends that the Compact Commission make the U.S. Forest Service a high priority among the federal agencies in actively negotiating reserved water rights compacts. Further, if the Commission takes a geographical approach to the Forest Service's reserved water rights claims, the Rock Creek drainage should be studied as a test case example of a basin with Forest Service claims are downstream of state-based private water rights claims.

D. IMPLEMENTING WATER ADJUDICATION DECREES

Issue

Some years in the future, when the Water Court issues final water rights decrees, determinations will have to be made as to how those decrees will be enforced so that all water right holders in the Upper Clark Fork River Basin will receive the flow rates in the priority to which they are entitled. In the past individual water users have only been concerned with their own decree or their own right within a sub-basin on a particular stream reach. Completion of the adjudication will end this isolation. All of the basin's water users will be tied together because the relative priorities of all right holders will be determined.

Consideration of all water rights from a basin-wide perspective will be important because of the large Clark Fork River mainstem water rights owned by Washington Water Power Company (WWP) and Montana Power Company (MPC). WWP has three rights at its Noxon Rapids Dam near the Montana-Idaho Boarder total-ing 55,400 cubic feet per second. These rights are filled on an average of only twenty-two consecutive days a year, generally in late May and early June during periods of high water. The priority dates for these rights are 1951 for 35,000 cfs, 1959 for 5,400 cfs, and 1976 for 15,000 cfs. MPC hold rights at its Milltown Dam located just upstream from Missoula for 2,000 cfs with a 1904 priority date. In some

years the flow of the Clark Fork at this dam falls below 2,000 cfs as early as June. In July of 1988 average mean flow rate at Milltown was 1,197 cfs, in August it fell to 627 cfs. Hence in 1988, MPC received only 60 percent of its right in July, and 32 percent in August.

During periods when their rights are not met, both WWP and MPC can call for curtailment of water use by junior water rights holders, those with rights more recent than those of WWP or MPC. Again, after the final decrees are issued, the relative priority dates of all water users throughout the basin will be known. This means that whenever their rights are not being met, WWP and MPC could issue calls affecting water rights throughout the basin (for MPC all mainstem and tributary junior users above Milltown and for WWP all mainstem and tributary users above Noxon Rapids). Clearly, the enforcement of these utilities' mainstem rights could be both complicated and costly and may exceed the value of the benefit to them particularly if the benefit amounts only to a partial fulfillment of their rights.

To insure fairness to all water users in every basin and sub-basin of the Clark Fork River, it may be necessary to create some system of enforcing all rights to ensure that each basin is contributing the amount of water pursuant to their decrees to which the power companies are entitled. Such a system could become a huge, expensive new bureaucracy.

Recommendation

The ongoing basin planning and management mechanism should begin considering the issues such as cost, funding, staffing, practicality, accuracy, and fairness relating to a future water right enforcement system.

E. WATER STORAGE

Issue

The Steering Committee deliberations have emphasized storage as an important management tool. It has initiated or encouraged studies designed to identify opportunities to increase storage through:

- New potential storage sites in the basin;
- Enhancement of existing storage sites; and
- Groundwater recharge which arises as delayed return flows (artificial recharge and return flow).

a. Structural Storage Alternative

The Steering Committee initiated a study of new and existing storage to identify priority sites for expanding structural storage in the basin. It formed a subcommittee of its members who assembled and examined existing studies for new or enhanced water storage projects and developed a screening process to rank potential storage sites. The process examined reservoir size, location, potential safety hazards, size of dam's fill versus amount of water stored, potential to resolve water conflicts, substantial conflicting land uses and known geologic impediments. The list of ranked reservoirs and the screening process was presented to both the full Steering Committee and the watershed committees. Basin water users, through the six watershed committees, were then asked to discuss potential storage sites, review research provided by the steering committee, and make recommendations as to potential storage sites, site conditions, beneficiaries, or other local conditions. From the deliberations of the storage subcommittee and the watershed committees, the Steering Committee identified the eight priority potential storage sites shown in **Table 5**.

Table 5. Priority Potential Storage Expansion Sites

New Sites:

Lower Browns Gulch - near Ramsey.
Cable Creek - west of Anaconda
Blackfoot Meadow - above Elliston
Upper Three Mile Creek - near Avon

Existing Sites:

Rainbow Lakes - southeast of Drummond
Gold Creek Lakes - southeast of Drummond
Upper Douglas Creek - southeast of Hall
Storm-Silver Lake - west of Anaconda

The Steering Committee then asked the Soil Conservation Service (SCS) and DNRC to analyze construction requirements and costs, known or modeled water availability, existing water rights, present operating regulations, new land use conditions and potential beneficiaries for each of these sites. The SCS evaluations will not be completed until late August of 1994. The Steering Committee and its watershed committees may have time prior to development of the final plan to consider the SCS study results.

Storage projects have been traditionally funded by the federal government and agricultural interests who have benefited from them. Funding and technical assistance are still available from federal agencies such as the SCS and the Bureau of Reclamation and state Water Development and Renewable Resource Development and Renewable Resource Grants and Loans Programs. These traditional sources, however, will probably not be sufficient to fund new storage projects without assistance from other project beneficiaries.

b. Non-Structural Alternatives

The paper in Appendix C by Eugene Manley, a member of the Steering Committee, and William Ohrmann, participant in the Flint Creek watershed committee, describes the role that irrigation return flows play in maintaining both diversionary water uses and in-stream flows. It also discusses how actions often considered to be water "conservation" or "efficiency" measures such as switching from flood to sprinkler irrigation and lining ditches and canals to reduce leakage can adversely affect return flows and the water uses the return flows support. While the concept of return flows is becoming better understood, particularly among non-agricultural water users, sufficient quantitative understanding of the sources, timing, and amount of return flows does not exist to permit return flows to be managed to benefit diversionary and in-stream water users in specific watersheds.

Recommendations

a. Structural Storage

The ongoing basin water planning and management mechanism should continue the investigations of the priority new and expanded existing water storage sites identified in the Upper Clark Fork River Basin Steering Committee storage study. In particular, it should identify the potential beneficiaries of and a funding mechanism for these priority sites.

The Steering Committee was unable to consider and make recommendations concerning the existing Georgetown-Storm-Silver Lake system because ownership of its facilities and water rights were clouded by litigation. When this litigation is resolved, this system should be studied to determine if its full water storage capacity is being utilized.

The ongoing basin water planning and management mechanism should also create some means to examine additional storage options in the basin as they arise.

b. Non-Structural Storage

The ongoing basin water planning and management mechanism should continue to support the Flint Creek return flow study that will allow this watershed to understand and better manage its return flows to benefit in-stream and diversionary water uses. The ongoing mechanism should promote similar studies of the role of return flows in watersheds throughout the basin.

F. WATER QUALITY

Issue

Four water quality problems prevent waters in the basin from supporting intended beneficial users: toxic metals pollution, dewatering, nutrient pollution, and non-point pollution. The metals sources in the headwaters region and metals deposits in floodplains of the upper Clark Fork cause seasonal exceedences of criteria designed to protect aquatic life. The groundwater adjacent to Milltown Reservoir has been contaminated with arsenic as a result of river-borne tailings material that has concentrated behind the dam. Periodic fish kills have been documented above Deer Lodge. Dewatering of the river for irrigation is an ongoing problem and summer water temperatures periodically exceed applicable water quality standards designed to protect trout. Nutrient additions from municipal sewage discharges, agricultural nonpoint sources, and natural sources promote the development of excessive quantities of filamentous algae and mid-summer dissolved oxygen levels occasionally fall below standards. The presence of large quantities of algae impairs beneficial water uses such as aquatic life, irrigation, and recreation. Nonpoint source pollution resulting from land uses including agriculture, timber harvesting and mining is a major problem throughout the upper basin, both in the tributaries and along the mainstem. Other water quality problems in the upper Clark Fork Basin are more localized in nature and include discharges of toxic substances from municipal wastewater treatment facilities (ammonia) and an abandoned post and pole operation, stream channelization and other habitat alterations.

Recommendations

a. Toxic Metals and Stream Dewatering

Sources and effects of heavy metals pollution in this drainage have been extensively studied for several decades. Remediation of the problem is currently being pursued under the federal Superfund Program. However, it is generally agreed that a complete elimination of sources will not be possible. Maintenance of current streamflow levels in the headwaters area during January through April will likely continue to be important to provide dilution of the Warm Springs ponds discharge. Similarly, maintenance of current dilutional inflows from the Little Blackfoot River, Rock Creek, and the Little Blackfoot River would appear to be important on a year around basis. Off-stream water storage and/or enhancement of summer streamflows in certain reaches of the Clark Fork could have negative consequences to some water uses now impacted by metals. A loss of flushing flows through spring storage could increase in-channel accumulations of metal-bearing sediments. Streamflow augmentation in the Clark Fork above Garrison, if [illegible] increase metals concentrations in the river by promoting erosion of existing [illegible]nel tailings deposits. Proposed new storage or other management activities [illegible]gime in the Clark Fork River, should, therefore, carefully consider impacts on [illegible]y toxic metal concentrations.

[illegible]oxious Aquatic Plants

[illegible] to reduce current rates of nutrient loading to the upper Clark Fork River [illegible]ious water quality problem. Such a plan has recently been developed by the [illegible] Washington and EPA Regions 8 and 10. The plan addresses nutrient pollution [illegible]-mile, three-state Clark Fork-Pend Oreille Basin. The development of this [illegible]S. Congress in amendments to the 1987 federal Clean Water Act. A tri-state [illegible]akeholders including county government, citizens, Indian tribes, businesses [illegible] established in 1994 to lead implementation of the plan. The ongoing basin [illegible]ent mechanism should continue to coordinate its activities with the tri-state

The Steering Committee and its watershed committees were instrumental in pursuing at the local level implementation of several recommendations contained in the tri-state plan. These actions include the adoption of a phosphate detergent ban by the City of Deer Lodge and planning for the land disposal of Deer Lodge's municipal sewage effluent instead of the current practice of directly discharging it to the Clark Fork River. The ongoing basin planning and management mechanism should encourage and assist other basin communities that have not already done so to ban phosphate detergents.

The Steering Committee organized several local meetings to evaluate the opportunities for land application of wastewater at Deer Lodge. These meetings led to the initiation of a planning study financed by the City of Deer Lodge and the Montana Department of Health Municipal Wastewater Assistance Program to evaluate the potential for applying effluent to hay fields on the Grant Kohrs Ranch national historic site. A draft of the report has been released and the project appears to be feasible. Meetings have been scheduled between the parties to discuss operational agreements, easements, funding options, water rights issues and other constraints. All parties are optimistic that the project will become a reality. The successful implementation of this project could decrease nutrient loading to the upper Clark Fork River by up to 30 percent and reduce nutrient concentrations in the river by 70 percent or more. The current excessive levels of nuisance attached algae would be expected to decline in many miles of the Clark Fork River. The DNRC has requested parties interested in this proposal to request an administrative ruling to clarify the need for water rights permits when disposal of sewage treatment effluent is changed from discharge to a river to land application. The ongoing water planning and management mechanism should continue to encourage and assist the City of Deer Lodge, the National Park Service, and the DHES in implementing this land application project. It should also encourage and assist other basin communities, e.g. Butte, Galen, Drummond, and Missoula, with considering similar projects. The ongoing mechanism should also encourage DNRC to resolve water rights questions surrounding land application.

c. Nonpoint Source Pollution

Nonpoint source pollution of surface and ground waters is derived from land use activities such as agriculture, silvaculture, mining, construction, land disposal, and others. The sources are diffuse and contamination usually results from overland runoff, percolation, precipitation, or atmospheric deposition rather than from a discharge at a specific, single location. The primary pollutants of concern include sediment, nutrients, toxic substances, pathogens, pesticides, acidity and salts. Nonpoint source pollution is a significant problem in the upper Clark Fork Basin. The primary pollutants are metals derived from floodplain mine wastes and waste disposal areas, and sediment, nutrients and animal wastes from agriculture and silvaculture.

The DHES has discussed with the Steering Committee and its watershed committees implementation of a voluntary, local non-point pollution control strategy. Watershed committees would survey and prioritize existing non-point problems and develop a plan for resolving them. When requested, DHES could assist watershed groups with funding and technical assistance. The ongoing basin planning and management mechanism should continue to encourage Upper Clark Fork Basin watersheds to participate in this strategy and should provide assistance when requested and able to do so.

G. FISHERY

Much is known about the effects of metals left over from past mining on water quality and on the trout food chain, physiology, and survival in the upper Clark Fork. These metal- related problems and many others adversely affecting the Upper Clark Fork Basin fishery are beyond the scope of the Steering Committee's mandate. This plan addresses only fishery issues involving in-stream flows and riparian habitat.

Issue

The Clark Fork River and many of its tributaries experience water shortages during the summer that adversely affect fish survival. DFWP has compiled a list of dewatered streams in the state which fall into two categories - chronic and periodic dewatering. Chronically dewatered streams experience sufficient dewatering nearly every year during the summer months to degrade fish habitat. Periodically dewatered

streams experience dewatering only during drought years when water is in extremely short supply. Streams that appear on these lists are only those which support important fisheries or contribute to important fisheries by providing spawning and rearing habitats. The portions of the list that apply to the upper Clark Fork Basin are shown in **Appendix D**. The number and miles of chronically dewatered streams in the upper Clark Fork Basin are shown in **Table 6**.

Table 6. Number of Miles of Chronically Dewater Streams In the Upper Clark Fork River Basin

STREAM	NUMBER	MILES
Big Blackfoot River Tributaries	16	69.4
Big Blackfoot River mainstem	1	11
Flint Creek Tributaries	6	4.4
Flint Creek mainstem	1	42.4
Little Blackfoot River Tributaries	14	49.7
Little Blackfoot mainstem	1	25.5
Rock Creek Tributaries	6	21.9
Rock Creek mainstem	0	0
Upper Clark Fork Tributaries	24	132.1
Upper Clark Fork mainstem	1	92.7
Total		469.1

On the mainstem, only the reach from Warm Springs Creek to Racetrack Creek is listed on the periodically dewatered list. The length of this section is 9.0 miles.

Improvement in streambank and stream channel stability, riparian vegetation, and other fish habitat features can improve spawning success and fish numbers. Several streams in the basin have been improved through cooperative efforts between DFWP and willing landowners. Projects completed or in progress to date include riparian fencing, riparian shrub planting, moving corrals off the stream, and improving fish passage over an irrigation structure. Many other streams in the upper basin could be improved, although the number of miles of streams needing improvement has not been determined.

Recommendation

The ongoing basin planning and management mechanism should continue to provide a communications link through which DFWP and willing landowners can discuss the opportunities for: leasing water; implementing the trial in-stream flow program outlined in this plan, if its is approved by the legislature: or making other arrangements to relieve dewatered stream sections and for stream habitat improvement on private land. DFWP will continue to seek willing landowners to help solve dewatering problems. It will also continue to utilize River Restoration Program funds (earmarked fishing license revenue) and fish kill mitigation money (ARCO settlement in 1989 fish kill) to fund habitat improvement projects on private land.

H. IN-STREAM FLOW PILOT STUDY

Issue

Under present law, water cannot be appropriated unless diverted or impounded. Hence existing water rights cannot be changed to in-stream flows without an act of the legislature. The administrative avenues available to protect in-stream flows are limited to the water reservations and the existing water leasing program. Only state and federal agencies can seek a reservation lease to protect in-stream flows on behalf of the fishery and only DFWP can lease water fro in- stream flows on twenty streams.

The Steering Committee has developed a proposal for a pilot program that would test a new mechanism for in-stream flow protection by allowing holders of existing water rights to leave water in-stream for fisheries and other benefits. The proposal would also allow water-right holders in the upper Clark Fork Basin to donate, sell or lease water rights to public or private parties for in-stream flows. The program is intended to apply only to the upper Clark Fork River Basin.

Transfers that occur under this proposal would be subject to all principles found in Montana's prior appropriation doctrine, including objections from affected water right holders. A transfer could not occur if it adversely affected the holder of another valid, existing water right (for example, if it was demonstrated that important return flows were interrupted). Prevailing objectors in all water-use change proceedings – not just those related to in-stream flows – would be reimbursed by the nonprevailing party for attorney fees and costs.

Each in-stream flow transfer under this proposal would be evaluated after five years if a petition to do so is made to the DNRC by a water right holder claiming harm. The transfer might then be reversed or modified. All transfers will be evaluated for adverse and beneficial effects by DNRC 10 years after the proposal is enacted by the Legislature. DNRC will then recommend to the Legislature whether the program should be permanent. The changes required by this proposal would have to be enacted by the Legislature.

The objectives of the pilot program would be to:

- Create cooperative opportunities for improving in-stream flows in the Upper Clark Fork River and its tributaries.
- Provide legal recognition that in-stream flows are a beneficial use, and that water does not have to be diverted to be considered appropriated in the Upper Clark Fork Basin.
- Ensure that any water user who converts a water right to in-stream flows can protect that right.
- Encourage willing-seller, willing-buyer transfers of water for in-stream flows while maintaining protection for all water right holders under the prior appropriation doctrine.
- Ensure that prevailing parties in all objection proceedings in the Upper Clark Fork Basin concerning water-use changes – including but not limited to those involving changing uses from diverted uses to non-diverted uses (i.e., in- stream flows) – are reimbursed by the nonprevailing parties for attorney fees and costs.
- Improve relationships between water users who divert water and those who don't divert.

Recommendation

The legislature should enact a pilot in-stream flow study for the upper Clark Fork River Basin only with the following elements:

1) Water does not have to be diverted to be appropriated for a beneficial use.

2) Any water right holder can leave water in-stream, provided there is no demonstrated adverse effect on other water right holders. The segment of the stream in which in-stream flows are to be protected should be described in any change of use application filings.

3) Water for in-stream flows can be transferred through donation, sale or lease to public or private interests.

4) All potentially affected water rights holders can object to a change of use for in-stream flows. (For example, if a proposed in-stream flow use would disrupt return flows to the detriment of downstream users.)

5) The cost of objecting by a prevailing party in all change proceedings will be paid by the non-prevailing party.

6) Evidence to demonstrate adverse effect will require criteria similar to current change or permit application objections.

7) The pilot program will be evaluated in two ways:

a) Each transfer or change of use to in-stream flows will be evaluated for adverse impacts on other water users five years after it goes into effect, upon a formal request to DNRC by water right holders who claim harm.

b) All changes and transfers for in-stream flows will be reviewed by DNRC for adverse and beneficial effects 10 years after legislative enactment. The results of the review will be reported to the next Legislature, including a recommendation on whether the in-stream flow/transfer process should be continued. This review could be tied into a review of basin closure.

8) The watershed committees created by the ongoing basin planning and management mechanism pursuant to Recommendation A above should be encouraged to review, informally, all proposals to leave water in-stream in an attempt to resolve change conflicts before they reach DNRC or the water court.

I. WATER RESERVATIONS

Issue

In 1986 and 1987, DFWP and the GCD, respectively, filed water reservation applications, as outlined below.

a. DFWP Application

In 1986, DFWP submitted an application for in-stream flow reservations in the mainstem Clark Fork River and 17 tributary streams from Warm Springs Creek to Milltown Dam near Bonner. The requests were intended to protect fish and wildlife populations by (1) preventing further depletion of stream flow and (2) maintaining existing water quality. Because of more than a century of diversions of water for mining and agricultural purposes, stream flow depletions were adversely affecting fish populations. In addition, mining wastes in the upper basin had produced major water quality problems in the Clark Fork River that were also harming the fishery.

Prior to 1972, few, if any, fish could be found in the upper reaches of the Clark Fork River. New waste treatment facilities installed by the Anaconda Company by 1972 allowed river fish populations to make a significant comeback immediately below the Warm Springs settling ponds. However, water quality problems continued to persist elsewhere in the river system. In addition, the state was continuing to grant new water use permits that contributed to the further depletion of the Clark Fork River and its tributaries. DFWP believed that, if given the chance, the Clark Fork could become one of the state's premier trout fisheries and recreational rivers, but only if sufficient water was left in-stream and the pollution cleaned up.

DFWP's application requested two kinds of reservations; (1) flows in the main river and tributaries necessary for maintaining fish habitat and (2) additional winter flows in tributaries necessary for providing water to the main river for protection of existing water quality, but only until mining wastes could be cleaned up. The current Superfund activities are now addressing the water quality problem. Although in-stream reservations would not produce more water, they would help ensure that flows would not be further depleted by new uses. They would, in effect, maintain the status quo of the existing fisheries and would allow for the eventual improvement in fish populations once mining waste problems were resolved.

By protecting existing streamflows and water quality, the in-stream flow reservations would have ensured at least the current level of use and enjoyment of the river. DFWP believed the water reservations, combined with the eventual reclamation of mining wastes, would allow the Clark Fork to be an even better recreational stream in the future. DFWP also believed that without in-stream reservations, the benefits of mining reclamation would not be fully realized. The quality of water would be improved, but the quantity depleted sufficiently to negate these gains.

At present, water reservations are the only legal means of securing in-stream water rights for fish, wildlife and recreation. They would simply have provided DFWP a water right priority date under the "first in time, first in right" principle. The priority date of the reservations would be senior to any new permits

issued by the state after the reservations were granted. However, they would not have affected any existing rights in effect at that time. The priority date was established by the legislature as May 1, 1991 when S.B. 434 was approved.

The in–stream water rights that could be granted to DFWP through the reservation process would do the following:

1) Provide DFWP the legal ability to participate in the decisions involving new water use permit applications, change applications, and other water right issues;
2) Establish a priority date for in–stream flows, even though it would be junior to users who already have water rights;
3) Establish an upper level of stream flow that could be achieved if additional water should become available through water rights abandonment or other means; and
4) Establish a right to water that is still physically available for appropriation on a more regular basis, such as winter flows that are as important to fish as summer flows.

When it entered into negotiations that resulted in the legislation establishing the Steering Committee and its mandate to develop a basin water management plan, DFWP was hopeful the process would fulfill as least some of the objectives of its water reservation application. Closing the basin as recommended in this plan to the issuance of new water use permits would preserve the status quo of stream diversion allowed by existing water rights. This helps fulfill one component of the fisheries need – water quantity – by preventing additional dewatering. However, basin closure does not enable DFWP to participate in water rights permitting or change processes that would be possible if water reservations were granted. A basin closure is acceptable and desirable only with the condition that the reservation process is preserved, with priority date intact, and that it could be pursued again in the event that the basin closure is rescinded, or modified, after a periodic review proposed in this plan.

b. Granite County Conservation District Application

In 1987, the Granite County Conservation District (GCD) applied to reserve water from Boulder Creek and the North Fork of Lower Willow Creek for future irrigation use in Granite County.

The proposed water reservation was intended for two projects:
1) A combination of storage and irrigation facilities to irrigate previously non– irrigated land using Boulder Creek as the water source, and the area immediately to the north as the irrigation site; and
2) Creation of a second storage facility in the lower Willow Creek watershed that would provide supplementary water to the area now being irrigated with water from the existing reservoir.

At the time of application, financial constraints, a lack of capital (including State and Federal assistance), and poor market conditions, prevented development of the two proposed projects. Cash receipts from crop and livestock production were down 25 and 2 percent, respectively, in 1983. This downward trend continued through the subsequent two seasons. Financial assistance for water development projects had been cut drastically and was continuing to decline at the time of the application due to federal and state budget cuts. GCD filed the water reservation application in an attempt to insure that water would be available when the economy became stronger and the proposed projects could be constructed.

Recommendation

The suspension of GCD's and DFWP's reservation application should be continued but be preserved with priority dates intact during the period of the basin closure. If a future closure review recommends either that the closure be terminated or that the exemptions to the closure be significantly modified, GCD and DFWP should retain the right to renew their reservation applications at the end of the closure period without loss of their priority dates. Renewing their applications could include modification to their original requests in light of any changed circumstances. If the DFWP reservation requests were modified downward, the established priority date would still apply. However, if a DFWP reservation request was to be modified upward or an additional stream included, the modifications would be considered a new application for that stream, and the May 1, 1991 priority date would not apply. Similarly, if any of GCD's reservation requests were modified upward or new storage projects were proposed, the modifications would be considered a new application, and the May 1, 1991 priority date would not apply. However, if the reservation request were modified downward, the established priority date would still apply.

[1] Watson, V. 1985. A Synthesis of Water Quality Problems in the Clark Fork River Basin. Proceedings – Clark Fork River Symposium. Montana Academy of Sciences. Montana College of Mineral Science and Technology. Butte, Montana.

APPENDIX A
SENATE BILL 434

85-2-336. Basin closure — exception. (1) As provided in 85-2-319 and subject to the provisions of subsection (2) of this section, the department may not process or grant an application for a permit to appropriate water within the Upper Clark Fork River basin during the period from May 1, 1991, until June 30, 1995.

(2) The provisions of subsection (1) do not apply to:

(a) an application for a permit to appropriate ground water or water for domestic use; and

(b) an application for a permit to appropriate water to conduct response actions or remedial actions pursuant to the federal Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, or Title 75, chapter 10, part 7. A permit issued to conduct response actions or remedial actions must be limited to a term not to exceed the necessary time to complete the response or remedial action, and the permit may not be transferred to any person for any purpose other than the designated response or remedial action.

(3) Applications for water reservations in the Upper Clark Fork River basin filed pursuant to 85-2-316 and pending as of May 1, 1991, have a priority date of May 1, 1991. Reservation applicants have no standing to object under 85-2-402 during the period of the basin closure provided in subsection (1).

(4) The board may not process or approve applications for reservations of water, except ground water, in the Upper Clark Fork River basin filed pursuant to 85-2-316 during the period of the basin closure provided in subsection (1).

85-2-337. Ground water permit applications — report required. (1) During the period of basin closure provided in 85-2-336(1), an applicant for a ground water permit in the Upper Clark Fork River basin shall submit a report prepared by a professional engineer or hydrologist verifying that the source of the ground water is not a part of or substantially or directly connected to surface water. If the applicant fails to submit the report required in this section, the application is considered defective and must be processed pursuant to 85-2-302.

(2) In addition to the criteria of 85-2-311, the department shall find, based on substantial credible evidence, that the source of the ground water is not a part of or substantially or directly connected to surface water.

85-2-338. Upper Clark Fork River basin steering committee — membership and duties — comprehensive management plan. (1) There is an Upper Clark Fork River basin steering committee. The department director shall appoint the members of the committee, selecting them on the basis of their knowledge of water use, water management, fish, wildlife, recreation, water quality, and water conservation. Representation on the committee must include but is not limited to representatives from affected:

(a) agricultural organizations;

(b) conservation districts;

(c) departments of state government;

(d) environmental organizations;

(e) industries;

(f) local governments;

(g) reservation applicants;

(h) utilities; and

(i) water user organizations.

(2) The steering committee shall complete an Upper Clark Fork River basin comprehensive management plan pursuant to 85-1-203. The plan must:

(a) consider and balance all beneficial uses of the water in the Upper Clark Fork River basin;

(b) include a description of the standards applied, the data relied upon, and the methodology used in preparing the plan;

(c) contain recommendations regarding the Upper Clark Fork River basin closure as provided in 85-2-336;

(d) identify and make recommendations regarding the resolution of water-related issues in the Upper Clark Fork River basin; and

(e) include the Blackfoot River, designated as subbasin 76F, and Rock Creek, designated as subbasin 76E, in any considerations made under subsections (2)(a) through (2)(d).

(3) The steering committee shall complete and submit a management plan to the governor and the legislature by December 31, 1994.

APPENDIX B
LIST OF
UPPER CLARK FORK RIVER BASIN STEERING COMMITTEE
PUBLIC MEETINGS

Type	Date	Location
Steering Committee	October 28, 1991	Deer Lodge
	December 9, 1991	"
	January 30, 1992	"
	March 3, 1992	"
	April 15, 1992	"
	May 19, 1992	"
	June 10, 1992	Flint Creek Watershed Tour
	July 23, 1992	Big Blackfoot Watershed Tour
	August 20, 1992	Butte–Anaconda– Georgetown–Silver Lake Tour
	September 19, 1992	Deer Lodge
	October 6, 1992	"
	December 19, 1992	"
	February 4, 1993	"
	March 25, 1993	"
	May 6, 1993	"
	June 10, 1993	"
	August 25, 1993	"
	October 21, 1993	"
	November 22, 1993	"
	December 14, 1993	"
	January 26, 1994	"
	March 1, 1994	"
	May 9, 1994	"
	June 1, 1994	"
	August 3, 1994	"
Work Plan	November 10, 1992	Anaconda
	November 12, 1993	Ovando
	November 17, 1992	Drummond
	January 12, 1993	Avon
	January 19, 1993	Philipsburg
	January 21, 1993	Missoula
Basin Closure	October 12, 1993	Deer Lodge

APPENDIX B
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Type	Date	Location
Watershed Committee		
Upper Clark Fork Mainstem & Tributaries	February 3, 1993	Anaconda
	April 7, 1993	-
	May 12, 1993	-
	July 14, 1993	-
	November 10, 1993	-
	March 23, 1994	-
	June 14, 1994	-
Lower Clark Fork	February 18, 1993	Missoula
	March 23, 1993	Drummond
Little Blackfoot	February 16, 1993	Avon
	March 23, 1993	-
	May 18, 1993	-
	June 22, 1993	-
	September 21, 1993	-
	November 16, 1993	-
	January 18, 1994	-
	March 8, 1994	-
Flint Creek	March 2, 1993	Hall
	May 4, 1993	-
	June 1, 1993	-
	August 16, 1993	-
	October 7, 1993	Hall
	November 9, 1993	-
	February 15, 1994	Philipsburg
	May 3, 1994	Hall
Rock Creek	March 4, 1993	Philipsburg
	May 5, 1993	-
	June 8, 1993	-
	February 9, 1994	-
	April 6, 1994	-
	May 10, 1994	-
Big Blackfoot	February 23, 1993	Ovando
	March 30, 1990	-
	April 29, 1993	-
	May 27, 1993	Potomac
	November 17, 1993	Lubrecht Forestry Station
	February 24, 1994	Lubrecht Forestry Station
	July 27, 1994	Lubrecht Forestry Station

APPENDIX C
RETURN FLOW FROM IRRIGATION STABILIZES WATER SOURCES

Drummond, Montana 59832

There seems to be plenty of controversy between agriculture, and other users of water. Disputes over the de-watering of streams due to irrigation demand are common.

A drought shocks all of us when we see a stream almost dry, however, ranchers and fisherman really want to see the same thing, a stream full of water. Although it may seem hard to believe, water taken from a stream and used for flood irrigation, doesn't necessarily mean less water in the stream. It can actually work to stabilize the flow later in the season. A proven method is in place that tends to solve this serious problem of de-watering, but we must be willing to understand the complicated way in which irrigation water works its way through a basin. In some basins senior water rights holders sometimes forgo their claims for usage of their rights so that junior right users in the upper basin will make usage of that water in early spring. This will recharge the aquifer, start return flows, and insure those senior users of an in-stream flow that will satisfy their needs later in the season. This method of keeping stream flow constant is one that Mother Nature uses, and it is a natural by product of flood irrigation. This water that finds its way back into a stream after being used for flood irrigation is called "return flow".

One must realize that the source of all water in a basin system is Natural Flow water. As water is diverted for irrigation use, some return flows start to develop almost immediately, others develop over varying lengths of time. Over time, and with distance downstream, we find the source of irrigation water changes from natural flow waters to return flow waters. At the same time we find this return flow adding up to a greater volume of water than the creek would ever flow naturally, and that flow now furnishes most of the water in the creek. That return flow continues to flow long after the irrigation season is over.

When snow melts or rain falls, Mother Nature tries her best to put some of it underground in the aquifer. Flood irrigation does exactly the same thing and tends to store water just as surely and dependably as a dam. If it were not for this system of storing water in layers of sand, gravel, and bedrock, there would be no springs, rivers or wells. Some areas of the world that receive as much precipitation as we do, but lacking the underground storage we enjoy, are virtual deserts.

Nature in our area only gives about nine to fourteen inches of precipitation a year. It seems reasonable to keep as much of this spring run off in small dams or stored in the land itself, rather than have it rush away to the ocean without an opportunity to have it put to use. With the system of ditches and canals in place, we are able to add a great volume of water to the aquifers. It is not a new thing, it has been going on since the first ditch was dug. It has gone on for so long that it is taken for granted that springs, wells, wetlands and creeks have had, and always will have water. After well over one hundred years of flood irrigation developments creating much of the water for these uses, it is understandable how people would make those assumptions.

To illustrate the above points we only have to look at the Willow Creek in Granite County, where all water available for irrigation is measured into the system, and all water diversions out of the system are also measured. In 1988, the driest year ever in that basin, late in the irrigation season on a particular day there was a measured inflow of one thousand thirty five inches of available water, yet there was a measured diverted outflow of some four thousand one hundred inches of usage. One would certainly ask where that extra three thousand inches of water came from. Most of it came from return flows created by early season flood irrigation, some of it from direct return flow.

In the Flint Creek Basin also in Granite County in that same year some 10,000+ acre feet of water were discharged into the upper basin out of the East Fork Reservoir. This furnished some 60,000 acre feet of usage throughout that basin, once again the difference of some 50,000 acre feet can be accounted for by the use and re-use of return flows. As in most basins of this State, if one were to tour the basin in late winter before spring run off and again in late June, or early July, a close observation would astound one as to how many formerly dry, or virtually dry watercourses are now flowing water, and how much total water

they are flowing, and the contributions they are making to the overall efficiency of the basin's usage of water.

In Flint Creek in 1988, after June 25th, well over 65 percent of the water diverted was return flow. Therefore, it makes sense to find out where those return flows are, what creates them, what the amounts are in different reaches, and knowing all these factors realize how we can fit them into a better management plan for all of the available waters. This is one of the reasons we now have in place a four year study of those return flows in the Flint Creek Basin.

If irrigation methods are altered we will see many changes that will effect us all. Some we won't especially care for, such as a much worse chronic de-watering of streams, and water shortages.

In many areas of the United States, like the Southwest, water is being pumped from ancient underground sources and the water table is lowering ever year. Wells hundreds of feet deep are going ever deeper. We hear how concerned people are trying to figure out a way to divert rivers of the North to these areas, to recharge and stabilize this underground source. The suggested method to recharge these aquifers would be by flooding areas that have proper soils so as to allow this water to percolate to these underground lakes. Flood irrigation on a grand scale!

For many years sprinkler irrigation was recommended as a way to save water. At the time it seemed like a good idea. Use only what the crops actually need and let the rest go down the stream. However this salvaged water was soon being used on new land, was being totally consumed, and wasn't going down stream at all. This of course is what sprinkler irrigation is supposed to do. Since it makes such efficient use of the water it also causes springs to go dry, and also puts an end to return flows.

Supposing in the future all lands were under sprinkler irrigation. One might then ask how things would be. There would be no more underground storage, fewer springs, and just small areas of seepage. We would have very few wetlands, and also some dry household wells. The creeks that we think we see de-watered now would have reaches dry virtually all summer with no chance of recovery, because there would be no return flows for them.

Another very often suggested method of conserving water is the lining of canals and ditches so as to stop water losses that leave those conveyances by seepage. This is an immediate solution that could have dramatic consequences creating more problems than it solves. Among those consequences are the drying up of valuable wetlands, and the simultaneous shut off of strategic return flow patterns that help stabilize a basin system.

Return flow which starts out as water diverted from a stream, irrigates land, is caught again and again and used over and over. Much of it seeps into the aquifer and comes out eventually as springs. Instead of being long gone out of the valley it is stored underground. It too, eventually reaches the ocean, but the good it does an irrigated basin by being stored and released slowly should be recognized as the gift it is.

One hears about developers wanting to drain wetlands, but not many ranchers feel that way about them. Most wetlands on ranches are valued as pasture, and as a source of water that eventually drains back into a creek. One could ask how many of these wetlands would exist if there were no flood irrigation, and the answer would be very few compared to what we now have. We all know of the numerous areas of typical wetlands, consisting of cattail areas, sedges, and small streams that are dry in spring, but get wet as soon as the land above them is irrigated. It is no secret, it happens every spring to thousands of acres in irrigated valleys. Willows and other small trees develop in some of these areas and furnish excellent habitat for all kinds of birds and other forms of wildlife.

If wetlands are important, as we are told, then these people who believe this should wholeheartedly encourage flood irrigation. So should fishermen, sportsmen, hydropower companies, and anyone else interested in seeing stable late summer stream flow, dependable wells and green valleys.

APPENDIX D
CHRONIC AND PERIODIC DEWATERED STREAMS IN THE UPPER CLARK FORK RIVER BASIN ABOVE MILLTOWN DAM

CHRONIC DEWATERING

Stream and Reach	Miles Dewatere
Blackfoot River Drainage	
Arrastra Creek	
Stream mile 2.5–2.0	0.5
Blackfoot River	
Seven–up Pete Creek – Poorman Cr.	11
Blanchard Creek	1.2
Chamberlain Creek	0.5
Clearwater River	3.5
Cottonwood Creek	
Stream mile 10.0–4.4	5.6
Gallagher Creek	3
Jefferson Creek	1
Nevada Creek	
Stream mile 40.0–34.0	6
Stream mile 31.7–6.4	25.3
No–Name Creek	0.5
North Fork of Blackfoot River	
River mile 12.0–6.2	5.8
Owl Creek	4.3
Pearson Creek	2.0
Poorman Creek	2
Union Creek	
Stream mile 7.0–0.5	6.5
Wales Creek	1.9
Washington Creek	
Sections 24 and 26	1
Wilson Creek	0.8
Total	82.4
Upper Clark Fork River Drainage	
Bear Creek	
Forks – Clark Fork River	2.2
Blum Creek (Tributary to Gold Creek)	2
Clark Fork River	
Racetrack – Rock Creek	92.7
Cottonwood Creek	
USFS Boundary – mouth	8
Crevise Creek (Tributary to Gold Creek)	2
Dempsey Creek	
N–S Forks – mouth	8.4
Gold Creek	
Pioneer – mouth	6.5
Harvey Creek	0.5
Hoover Creek	
Miller Lake – mouth	5.4

Stream and Reach	Miles Dewatered
Lost Creek	
State Park – mouth	12
Mill Creek	
BA&P Tracks – Settling Ponds	6.6
Morris Creek	4
Peterson Creek	
USFS Boundary – mouth	10.5
Powell Creek	
Powell Lake – mouth	6.5
Racetrack Creek	
USGS Station – mouth	11.3
Rock Creek	
Rock Creek Lake – mouth	10.9
Storm Lake Creek (Tributary toWarm Spring Creek)	2
Swartz Creek	0.5
Taylor Creek	
Lower Taylor Reservoir – mouth	4.7
Tigh Creek	1
Tin Cup Joe Creek	
Conley's Lake – mouth	5.2
Twin Lakes Creek (Tributary to Warm Spring Creek)	2
Warm Spring Creek	
Hwy 273 – mouth	8
Warm Spring Creek (near Garrison)	
Falls – mouth	5.4
Willow Creek	
Mt. Haggin WMA – Settling Ponds	6.5
Total	224.8

PERIODIC DEWATERING

Clark Fork River Drainage	
Clark Fork River	
Warm Springs – Racetrack	9
Total	9